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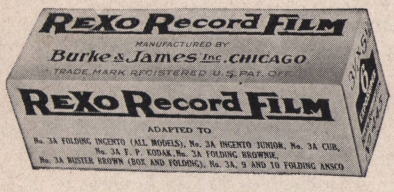

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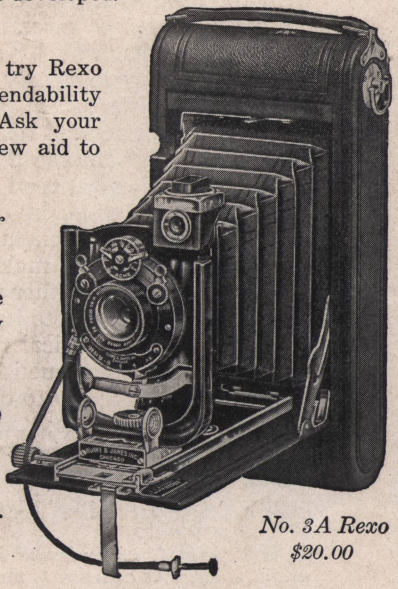

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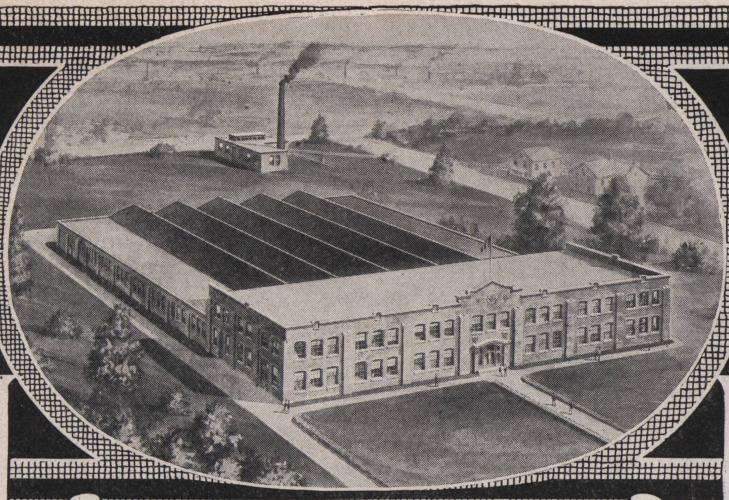

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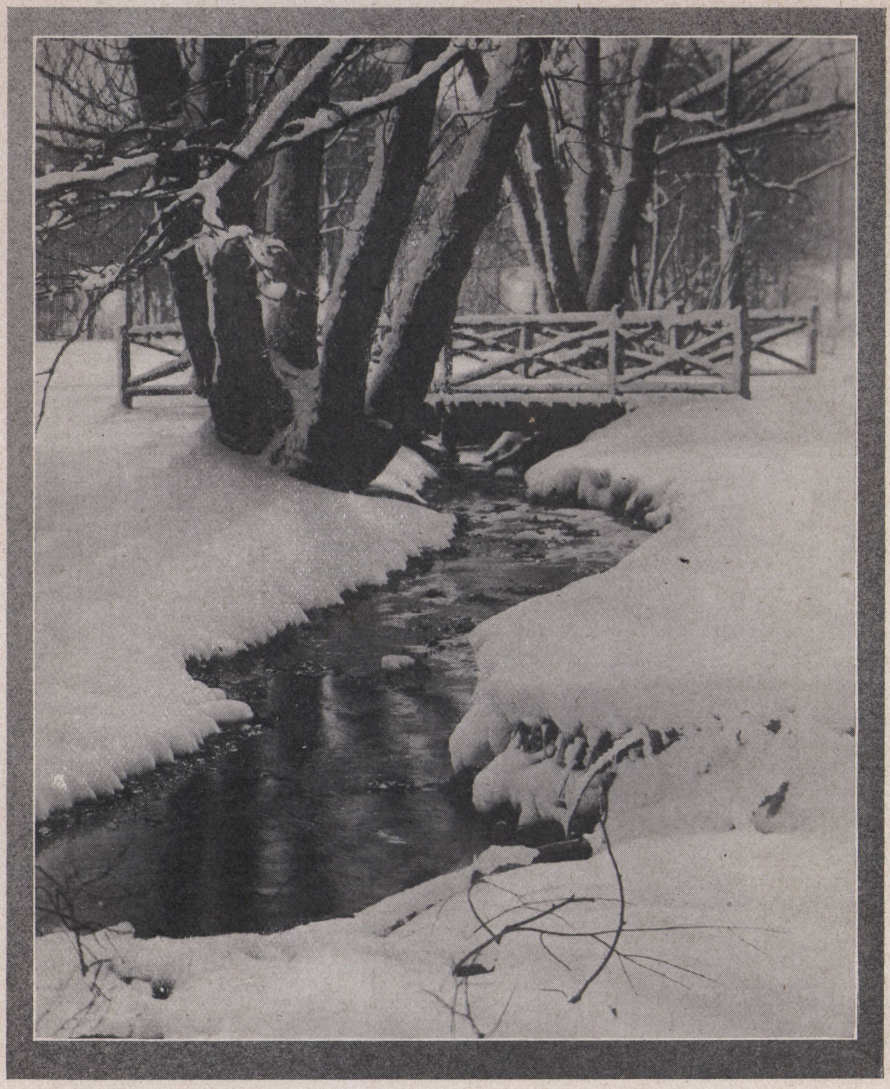


WINTER

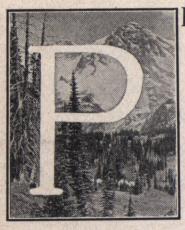
KARL FICHTNER

AMERICAN PHOTOGRAPHY

VOL. XI BOSTON, MASS., JANUARY, 1917 NO. 1

SNOW PHOTOGRAPHY

E. S. ANDERSON



PRACTICALLY every writer on this most interesting of topics pays his respects to those recalcitrant followers of our hobby who shelve their cameras during the winter months. We will omit the usual censure, and merely remark that in spite of the stress of preparing studies for the spring exhibitions, and working up and improving previously made negatives, it is to be hoped that every reader will make a few good snow photographs to include among his more serious efforts. The subject has been covered before by so many different able writers, considered from equally diverse standpoints, that in the present articles, what is more of an outline will be attempted, rather than a complete discussion.

Any camera is suited for making good snow pictures. Needle-sharp negatives are not necessarily a desideratum, and consequently it can be taken for granted that any lens is equally available. The fewer attachments, the better, for they must be adjusted in most cases with the bare hands, which soon become too numb for turning the more delicate levers and screws. Beside the camera, field equipment should include a ray filter, a lens shade, and a tripod. The ray filter is a necessity on bright sunny days when the blue of the sky would yield a negative with sky values lighter than the snow, and will prove a boon in relieving the excessive contrast between evergreen foliage and white snow. Very naturally the use of the filter makes a tripod a necessity, for very rarely, even with a light filter and a very fast lens, can snapshots be made of snow scenes where there is any dark foreground. The lens shade is an added necessity for this class of work, for snow and ice can often be pictured to advantage with the sun ahead; with the direct as well as reflected rays striking the surface of the collecting lens, trouble may be expected if the lens is not shielded more adequately than by the hand or a plateholder slide.

In commenting on the need of a ray filter, the use of an orthochromatic emulsion was anticipated. Most films are more or less orthochromatic, sufficiently so for this class of work. A deep filter, with full exposure, on any American made film, will produce a perfectly graded image, entirely free from halation. Plate users are advised to make use of a double-coated brand which is suited for all-around work, so that the worker is entirely familiar with its characteristics — for nearly all plates have their peculiarities. A backed plate is ideal for snow studies, but is not popular in this country as it is such a nuisance.

When the ground is covered with a snowy mantle, or with a sheath of glistening ice, ordinary objects lose their commonplaceness, and the man with a camera need not go far afield for artistic results. The city man may find a snow-laden bush in the back yard

providing ample material; after a heavy snowfall, the average street with its long parallel mounds of snow thrown up on both sides of the walk and leading the eye into the distance, forms a pleasing sight. The same view on the following day, when a thaw has raised a pall of fog, has a totally different though equally interesting appearance.

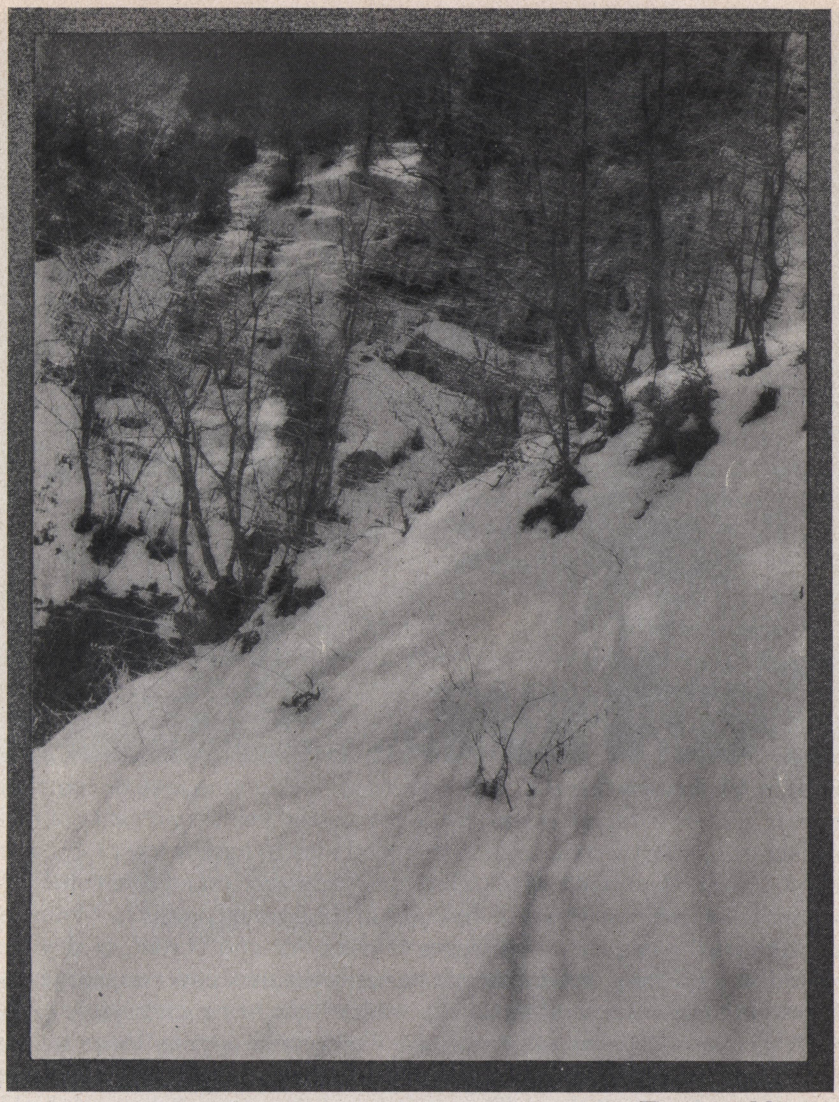
Generally speaking, the city man had best endeavor to find a few minutes to take his camera into "the park" after a snowfall. This is true, as usually it is best if no buildings are included in snow pictures, because they are not snow-covered, the snow having melted or catapulted off the roof, as the case may be. It must be admitted that a snug little farm house half buried in a swirl of snow can be made into an interesting study — but we are considering the average case in the foregoing statement. Such pictures as Mr. Laity's "Sparkling Winter" (page 45) and Mrs. Anderson's "The First Snowfall" (page 15) can be found in the larger city parks where a bit of woodland and stream has been retained. Or a suggestion of the rustic may be brought to mind by seeking out a rough-hewn bridge, snow-covered, such as is shown in Mr. Fichtner's "Winter," shown on our frontispiece.

A bit of a roadway, a rail fence, or a stone wall afford chances for good studies where the worker has a chance to walk a little farther afield. Mr. Domonka's "Winter" (page 13) and Mr. Easton's "Ice Storm," (page 19), furnish two good examples of this. The roadway furnishes the best effect, probably, when the middle distance and beyond is obscured by snow or fog; the stone wall is most picturesque when the snow has drifted and swirled unevenly in drifts and hollows. The zigzag of a rail fence and its shadows on a bright sunny day have been illustrated so many times that it hardly needs mention, but nevertheless presents opportunity for interesting studies, for no two sections of even the same rail fence are ever alike.

Getting further out into the country we may expect a wider variety of subjects of all kinds from mountain-top scenes like Mr. Roy's "Winter Landscape" (page 21) to wintry expression such as Mr. Wendell's "Snow Shadows" (page 39). In addition to these are the genre subjects, which can be made by anyone, anywhere, and a whole list of winter sports, which furnish a multitude of chances for originality on the part of the worker, whether he is showing young Jimmy in the act of making a snow house, or catching old Jimmy taking a perilous leap through the air on skees.

In the examples mentioned, it will be noted that the studies are of two distinct types. In one type everything is blurred and indistinct; in the other all details are sharp, there is a tracery of shadow and halftones plainly visible on a brilliantly lighted snow. The difference is due to a proper selection of the time of taking the pictures. When the clean-cut, sparkling views are wanted, the worker must be in the field before ten o'clock in the morning, or after two in the afternoon, when the shadows are long, and the crystalline texture of the snow is brought out by a side lighting. Here the lens shade and ray filter will be of great aid, taking the picture "into the sun" many times, to get the greatest amount of shadow relief. The second type can be obtained on the foggy, misty days, or during a snow storm, and an ordinary emulsion and the absence of the ray filter is permissible. Full exposure but not overexposure is advisable, and printing paper developed with a small amount of carbonate will further the atmospheric effect. When the ponds begin to thaw and shell ice and flurries of snow are a daily occurrence, this type of studies can be made to advantage.

Snow is far from being a blank white surface. It is full of hollows and shadows, causing delicate halftones which are the making of its beauty. These must be preserved, so that the texture of the snow is visualized by one who sees the picture. The second important thing to bear in mind is that shadows and dark objects should be full of detail, as the contrast of a wintry landscape study cannot be anywhere near the extremes permissible by the negative.



MORNING SHADOWS — FORMAN HANNA

Trees should not be dead black — except when shown in silhouette as in Mr. Roy's "Winter Landscape," which, by the way, is a pinhole picture. In general, the key of a snow study should be higher than normal. A third important consideration is the proper preservation of values, especially when the sky is included, excepting perhaps those dull days when the sun is obscured by heavy dark gray clouds, which require no color correction. A fourth consideration is in the selection of a proper printing medium.

The preservation of the delicate values in the snow itself, without producing black heavy shadows, is attained by following the age-old rule of "exposing for the shadows, letting the highlights care for themselves." It will not do a bit of harm if twice as much exposure is given as seems correct, so great is the contrast of the average snow scene. In developing, especially when making small negatives for enlarging purposes, development should be arrested soon after shadow detail has been completely brought out on the plate. For

instance, using our modified Thermo development, plates classed as M or slower can be advanced two classes in development speed, others one class. This will produce a negative with good detail but with contrast suited for contact printing or enlarging on bromide papers.

The correct preservation of values is accomplished by the use of the orthochromatic emulsion and ray filter. Care should be taken to avoid over-correction, as this is as objectionable as no correction. For those who are inveterate snapshot workers, a differential filter will be an aid, while others should use a filter of a depth suited to the emulsion selected, which the manufacturer will be glad to designate.

The printing medium should usually be black and white, although we have seen some very effective blue and white photographs of snow. For large prints, a rough surface paper such as P.M.C. Rough Bromide is a good medium for enlarging, especially when the snow masses are heavy. A linen surface paper such as Enlarging Cyko Linen is excellent for rendering studies in which icy branches or crusted snow has been photographed against the light in such manner that it sparkles — the linen surface having a sparkle that furthers the effect. Bromide fabric is another good medium for snow pictures, and for soft, dull-day effects carbon and gum can sometimes be used to advantage.

Mounting a snow study requires unusual care, because of the delicacy of the tones. Nearly every worker has a pet mounting scheme of his own, and many are attractive. The aim should be to border the print with a margin which will "lift" it from the heavier stock that is used as a mount. The print, border, and mount must harmonize. In mounting snow studies, take into consideration that the key is rather high, that the snow should appear as white *with gradation*, that the dark portions of the image are represented by grays in the print. If a gray border is selected, its tone about halfway between the highlights and shadows of the print, the right effect will be secured. By contrast the snow will *seem* whiter and the shadows darker *with no loss in detail*. Mounting may be completed on a background that is lighter or darker, according as the worker feels the necessity of making the print seem darker or lighter by contrast. It is a good idea to keep a few pieces of mounting papers on hand, cut into L-shaped strips, which may be placed on adjacent sides of the print to get an idea of what combinations will look best in the finished product. Mounting may be done with a glue pencil along the upper edges of the print and border, or dry mounting may be resorted to. If heavy mounts cannot be easily secured, cover paper may be mounted on cardboard and trimmed, serving equally well. After being completed, rubbing down the print with a wax preparation will impart a brilliance that goes well with well lighted snow studies.

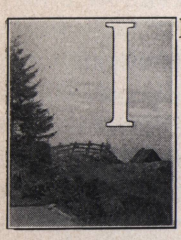
Snow photography really presents no new problems, but requires merely a consideration of existing conditions. The weakness of the winter light, and the likelihood of cold developer have not been mentioned in connection with them. Careful workers will take them into consideration in every class of subjects, and those who use a systematic method of exposure and development, the American Photography Exposure Tables and Thermo Development Card, for instance, need anticipate nothing but pleasing results in this branch of photography.

In closing, perhaps, after all, it will not be a bad idea to say a few words "to those recalcitrant followers of our hobby who shelve their cameras during the winter months." You shivering stay-at-homes, who hug the fire while the snow swirls outside — have you any idea what you are missing? Go back a few years in memory. Have you forgotten how it felt to bundle up in your cap and sweater, arctics and leggings, and drive head-on into the wind and snow? How your face tingled! How the blood raced! Go out into the open with your camera, and when another span of years is crossed, you will have snow pictures to help your memory back to the "good old days."

THE SAND DUNES OF SAN FRANCISCO — FRANK FLANNERY

HOW TO MAKE LANTERNSLIDES

BAYARD BREESE SNOWDEN



IN this article we are presupposing that the reader has a lantern, or is considering the purchase of one, and that the subject is of interest to him because he has a goodly number of negatives from which he would like to make slides. The fact that the slide is 3¼ x 4 inches always, that it is a positive and a transparency, and that it consists of a photographic image between two glasses, is already known to him. It is the method of producing the slide, as well as what to aim to produce, that needs his attention. In selecting the negative from which the slide is made, remember that every defect, as well as every detail, is shown in enlarged form on the screen. Consequently, only perfect negatives should be selected, with the possible exception of those with blemished skies which can be thinned down by reduction, or better skies "printed in." Also do not overlook that the long dimension of the slide is always inserted in the lantern horizontally. Hence, no matter how the negative was made, whether up-and-down or horizontal, the slide must be made so that the verticals of the image are perpendicular to the 4-inch dimension, and so will be projected vertically on the screen. By the use of masks, the slide-images may be varied in size and proportions, but any such changes must be accommodated to the requirement just mentioned.

Uniformity is the very first essential of a pleasing collection of lanternslides, taking for

granted the good quality of the image. When projected on the screen, they should have about equal brilliancy, other conditions being equal. To make this possible, material and equipment must be handled in such fashion that the correct contrast and density is standard with all the slides. Correct contrast and density is not a describable standard, as it will vary for different lanterns according to the illuminating source and projecting lens. Under the circumstances it is plain that each worker must select a standard to suit his conditions, which in most cases will be permanent home conditions, and then produce uniform slides which fit the light efficiency of his lantern.

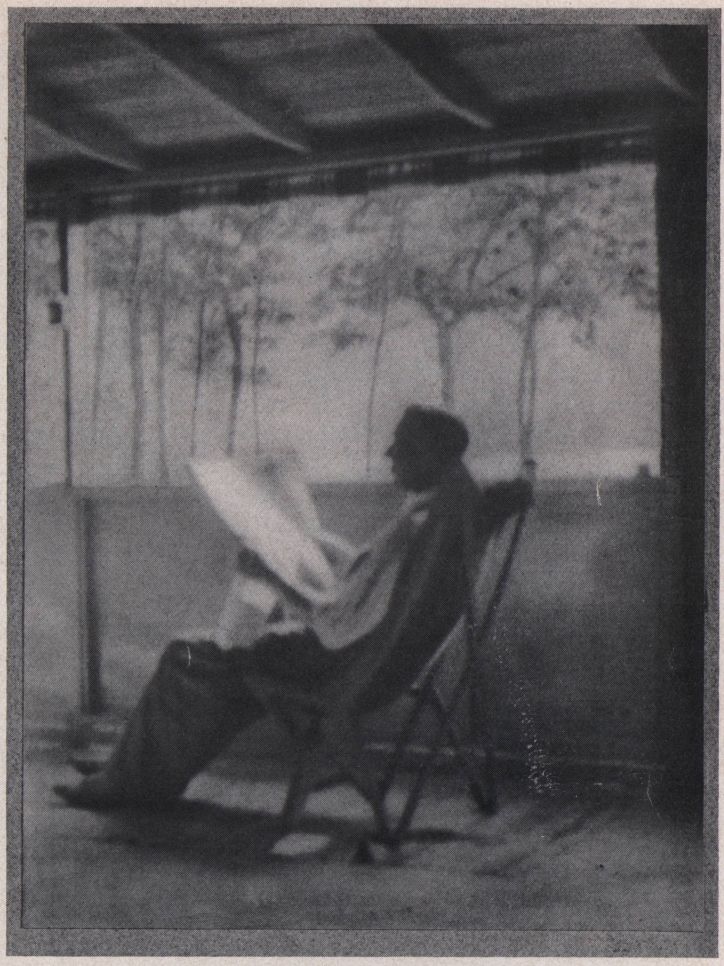
The process of making lanternslides is little different than the making of contact prints or enlargements on gaslight or bromide papers, the main difference being that the slide is made on a transparent base so that it may be viewed as a transparency or projected by means of a lantern. There are two usual methods of making lanternslides—contact and projection. The latter is commonly used where the image desired is too large for contact printing from the negative — say 5 x 7 — and must be projected in reduced size on the lanternslide plate. Sometimes the image is enlarged on the slide, projected from a small negative — as a V.P. size — with the idea of gaining in size on the final image thrown on the screen.

In the projection method there are two usual means of procedure. Probably the most satisfactory is to place the negative in an enlarger or lantern as usual, and place the lantern-slide plate in the position ordinarily occupied by the bromide paper. This makes necessary a long bellows extension, and it may be found necessary on that account to resort to the second method, in which the slide is exposed in the camera. In this case the negative is placed in a frame in a window, a reflector placed at an angle of about 45 degrees outside — to ensure even illumination — and the slide exposed by placing it in a plateholder in the camera and focusing on the illuminated negative, good position of the image being secured at the same time.

Most readers will use the latter method, as enlarging lanterns or built-in enlargers are not a part of their equipment in the majority of cases, unfortunately. Consequently, the method needs to be taken up in more detail. Daylight is not a satisfactory source of illumination for the work, as it varies so much from month to month, as well as from hour to hour, a factor causing considerable waste. Consequently, it is best to make a device for evenly illuminating the image by artificial light — which can be done quite simply. Simply secure a kit to hold plate negatives or two sheets of clear glass between which a film negative can be masked. Build this into a wooden frame about 15 inches square, made opaque from the edges of the kit to the outside of the frame by tacking on pasteboard. About an inch back of the opening in the kit, fasten a single sheet of ground glass, narrow strips of wood and tacks being sufficient to hold it. A pair of right-angled shelf brackets fastened to a baseboard will hold the frame and kit vertical. The camera should be firmly placed on a box or pile of books, squarely in front of the negative, so that the image on the slide will be centered and all vertical lines parallel to the edges of the slide. Occasionally, if the original negative is distorted, the frame can be inclined at an angle to the optical center of the lens of the camera, so that the distortion is corrected in making the exposure on the lanternslide. In illuminating the screen, magnesium ribbon, an electric bulb on a cord, or a short length of iron pipe with a gas burner on the end—coupled to the gas main with rubber tubing—will be sufficient. Exposure should be made with a small stop in the lens. The light-source must be kept in motion, crisscrossing back and forth about 6 inches behind the ground glass, so that the illumination will be entirely even. By using this means of illuminating, the exposure can be exactly duplicated and measured, as the light intensity does not vary. Magnesium ribbon put up in the holder supplied by the Kodak Company is very convenient, a

measured length being used in making each exposure. How much ribbon to use, or how long to keep the lamp behind the ground glass, will depend on the negative, degree of reduction, and speed of the lanternslide plate, but having been found once, will cause no trouble in figuring thereafter.

Users of film cameras, from 2½ x 4¼, or 3¼ x 4¼ and larger, most commonly make use of a contact method of making slides, as the image-size obtained on the negative is of about the right degree. The two sizes mentioned are usually made with lenses of about 5 inches' focal length, producing an angle of view on the negative well adapted for projecting with the lantern, for record work and the like. For pictorial work a lens of longer focus and producing a narrower angle of view is more satisfactory, while a wide angle lens—3½ inches' focal length on the quarter plate—may be used in emergencies. In the main, however, the lenses used for hand-camera work in the popular sizes produce images which can be printed by contact direct on the slide.



JUS' SITTIN' AROUND — PAUL WICRUM

In printing by contact, it is most satisfactory to buy and use one of the printing frames designed especially for slide work. These have a secondary back, clamping into an opening in a larger back. The opening is the size of a lanternslide plate. The negative is placed in the frame and adjusted beneath the opening in the back. After clamping, a lanternslide plate is dropped into the opening, and the secondary back clamped down, when the combination is ready for exposure. A makeshift arrangement can be provided by cutting a pasteboard sheet the same size as the inside dimensions of the printing frame, and then cutting a 3¼ x 4 opening in this, into which the lanternslide plate is dropped after the film is adjusted beneath the opening. In case the slide is made by contact from a smaller plate, the frame should be well padded with thin pasteboard, so that there will be no chance of cracking the glass when the back is clamped on. In the same manner when making a slide, say from 5 x 7 negative placed in a 5 x 7 frame, pad around the slide with pieces of pasteboard, especially if the frame springs are stiff, as the pressure on the middle of the 5 x 7 negative may split it into a hundred small pieces.

In setting up the equipment for slide work, remember the need of uniformity, and be guided accordingly. Adopt some arrangement whereby the lamp for printing will be about 3 feet from the printing frame, provision being made to have this distance kept exact, so that exposure will have in it only one factor to be considered, *i.e.*, its length — the distance of the frame from the light, and the strength of the latter being constant.

The methods of working being understood, it remains to consider the material and its use. Lanternslide plates fall into three general groups. Those in the first are coated with an emulsion similar to that of bromide paper. These are the fastest, though, of course, they are much slower than plates used for ordinary photographic purposes. Those in the second group are coated with a bromide-chloride emulsion. They are practically the same in speed, but slightly more contrasty. Those in the third group are coated with a chloride emulsion, similar to that used in making gaslight papers. These are much more contrasty and much slower than the others — so much slower that they may be worked in ordinary artificial light like D.O.P. They are therefore commonly called "gaslight" plates. In the first class, for instance, belong Wellington Special and Imperial Special; in the second, Wellington Vigorous and Imperial Velona; and in the third class, Wellington Slow Contact lantern plates. I mention these two makes in particular partly because they are well-known and widely advertised, but still more because though there are many other good lantern plates, they are the ones with which I have had the most extensive experience in getting satisfactory results. The Wellington and Imperial Specials are fast and soft, suitable for use with negatives of good strength and contrast. The Wellington Vigorous and Imperial Velona are slightly slower and slightly more contrasty. The Wellington Slow Contact are very contrasty, just the thing for soft, thin, or otherwise flat negatives; they pick up contrast after the manner of the contrast grades of developing papers.

Velox Film is a lanternslide emulsion coated on film support. It is tougher than ordinary film, and its great advantage lies in the fact that it is unbreakable, and has practically no weight, being mounted in a pasteboard frame of standard lanternslide proportions. Its greatest disadvantage is that it cannot be used in a lantern giving off a large amount of heat (such as one equipped with an electric arc), unless the lantern is equipped with a water cell, such as is provided with the Kodiopticon. I have two or three hundred Velox film slides, and can testify to the fine combination of brilliancy and softness — richness is perhaps the word — obtained where the slide is made from a negative of good strength. Velox film is, of course, designed particularly for home exhibitions, and for this purpose will be found satisfactory. It has a gaslight emulsion, softer, however, than that of the Wellington Slow Contact plate. The best results are obtained when printed from plucky negatives — such as the average amateur using a hand camera is likely to make when snapshotting.

The next consideration is the developer. For those who make up their own solutions, the different plate manufacturers furnish optional formulas. I know of no "pet" formula which will improve on those thus given. Every developer can be used in some form — even pyro — so that there is a large field for experiment open to those so inclined. For those who use prepared solutions, I can recommend Nepera Solution (Eastman), which by past experience I know will produce excellent results on any of the slide plates mentioned, used in the proportions of one ounce of stock to four of water. Exposure should be so timed with this combination that development will be complete in from two to four minutes, according to the nature of the negative.

For fixing bath, plain hypo should not be used, as stain must be prevented at all costs. Perhaps the best bath is made by adding about an ounce of liquid sodium bisulphite to a

quart of one-to-five plain hypo solution.

So much for methods and materials. The only remaining factor to consider before discussing procedure is that of the light. The illumination should be the greatest possible, limited only by safety. The plates are developed fully when they appear of correct value when looking *through them*, and this means that a maximum of light is needed to make one's judgment of correct values as near what it would be under white light as possible. Under a dim red or orange light, judging values is a very delusive thing at times. For developing Wellington Slow Contact Plates and Velox Film, a good yellow light such as is used when handling gaslight paper is sufficient — *but test it.* For other plates a good orange light usually proves safe—*but should be tested.* I emphasize this point because fog on a lanternslide spoils it, unlike a small deposit on a negative. A makeshift homemade safelight — with a large sheet of orange glass or fabric — is as well suited for the workroom as one purchased at a high price. *But test it to make sure it is safe.*

DECORATIVE COMPOSITION ALICE WILLIS

Plentiful illumination of this sort is important not only to simplify development, but also to make easier the preparation for exposure. It is difficult to adjust a negative and a lanternslide plate in the printing frame satisfactorily in a poor light. With a plentiful orange illuminant, however, one can stand off about three or four feet, hold up the frame with negative and slide in it, and look through to see that he has everything just as he wants it before he clamps the back on.

In adjusting the slide plate over the negative, there are three points to be considered. In the first place, it is absolutely essential that the verticals, such as the walls of houses, etc., be parallel to the sides of the slide plate; otherwise the slide will not show up properly on the screen. The worker should not forget that a slide cannot be trimmed. In the second place, if the negative is smaller than the slide plate, or is so placed that some portions of the latter project beyond it, it is advisable to use a mask around the negative, in order to prevent halation along the edges. In the third place, before adjusting negative and plate, the worker should have some notion of the size and proportions of mask which he may afterwards use in mounting, that he may place the image on the plate with reference to this point.

This is not a difficult matter, the main thing being that the image as masked should come in the center of the slide, as nearly as possible. These factors must be met also in the projection method.

With the slide in the printing frame, or in the camera if the projection method is being used, we will now make an exposure. At first it is a good idea to cover a third of the negative at a time, giving exposures of say, ten, ten, and twenty seconds in covering each, so that the lanternslide will be exposed in three sections, having received ten, twenty, and forty seconds' exposure respectively. This first trial will give an indication of the time for exposure, and will waste but a single plate. The units given may not be correct, but will give an indication for a second trial. Once ascertained, the time should be noted, and after a few slides have been made, there will be small occasion for wasting a plate, except, perhaps, on exceptionally puzzling negatives.

From the frame into the developer is the next step. The tray should be rocked in both directions constantly, to prevent streaks or freaks. It should also be covered during the greater period of development, being removed and examined from time to time to make sure that development is progressing satisfactorily. When the image has the proper strength, as viewed by looking through it when held in front of the safelight, development is complete. A few seconds after the image looks satisfactory, the slide should be removed to the fixing bath and rocked in the tray for a few seconds to make sure the action of the retained developer is completely arrested. Some workers advise developing just a shade farther, and then reducing with Farmer's reducer to the proper density. It certainly brightens the slide considerably to give a quick application of the reducer in any event, just to remove the slight surface veil that appears on practically all slides.

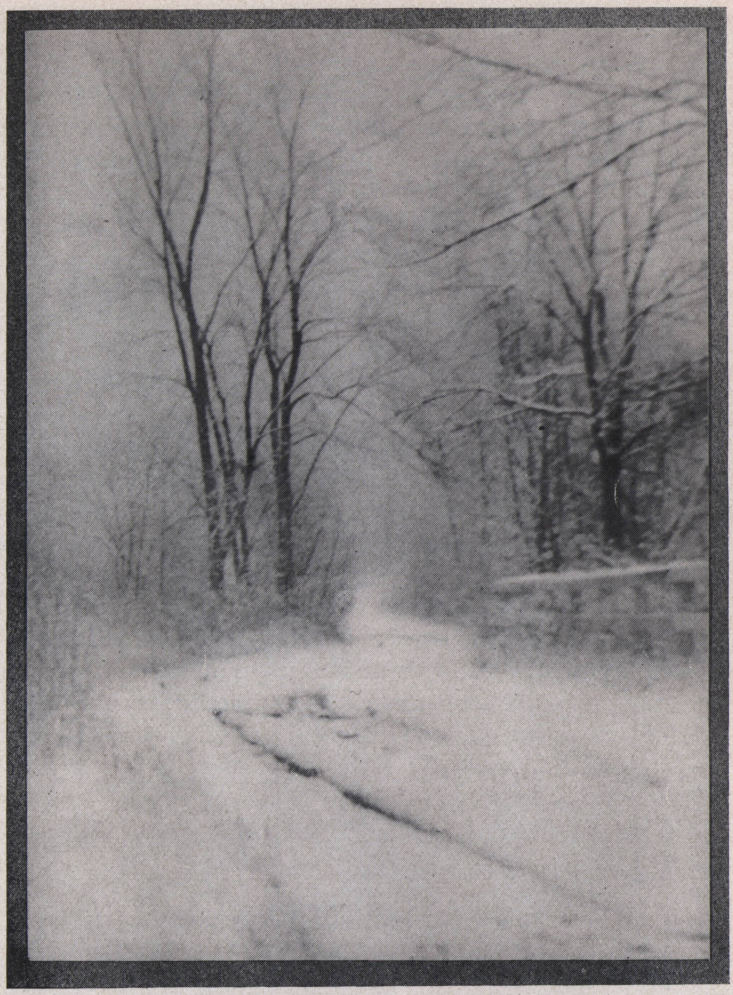
The matter of contrast of the finished slide is considerably within the control of the operator, making use of the lessening of contrast due to increased exposure, and to the increase in contrast due to the use of more bromide in the developer. As long as the bromide is added *before* the plate is placed in the developer, it will have the effect of increasing contrast. This alteration in contrast is somewhat different from that obtained in using different emulsions, and the worker who plans to make many slides had best get a copy of that excellent little book on slide making by the Rev. F. C. Lambert, obtainable from the publishers of this magazine, in which he describes the control permissible by this method.

If the plate flashes up in the developer, or the image fails to come up in the highlights, further time spent on the slide is wasted, and it had best be placed under the hot water tap and cleaned off — to be used as cover glass, a most economical proceeding, considering the present price of glass.

After the slides have been developed, fixed, and washed in the usual way, they are put aside to dry. Then comes the final process of masking and binding. For this purpose a supply of masks, cover glasses, and binding tape should be provided. Not a few workers advise against the use of stock masks with rounded or "cushion" corners such as are obtainable from stock houses and dealers, preferring to mask the image with binding tape, but after considerable experience with both methods and examination of a good many professional slides, I would unreservedly recommend the provision of a supply of the regular stock masks of various inside dimensions and proportions, eliminating, however, all such things as domes, circles, ovals, etc., using only the rectangles. The cushion corners, always objectionable in prints, are not objectionable in slides, and may indeed be a decided advantage, as they tend to conceal any queer angles or lack of parallelism caused by unevenness of the screen or inaccurate placing of the lantern. The masks usually come in packets containing each two dozen of a kind, and, as the cost is small, one can obtain for a half

dollar or so a sufficiently large and varied supply to meet his wants for a considerable period. Binding tape may be purchased in rolls, like ribbon, or in boxes of long strips, each strip sufficient for one slide. It is so inexpensive that no one who has used it will want to save money by cutting up black paper and applying paste.

The chief object in mounting a slide is to protect the emulsion side from injury; the coverglass, clean and free from lint, is therefore laid over the *emulsion* side, with the mask between, the whole being bound up with tape. There is on the market a small vise for holding slide and coverglass in juxtaposition while the binding is in progress, but although this vise, which incorporates the principle of a pivot, is a great convenience, it is not necessary.



WINTER — STEPHEN DOMONKOS

When the slide has been bound it is "spotted." That is, a small piece of white paper in the form of a star or circle is pasted to the lower left-hand corner on the emulsion side of the slide, which is, of course, the right side for viewing it. This spot is a guide to the person who operates the lantern. He knows that if he puts the slide into the carrier with that spot in the upper right-hand corner (the right-hand corner as he faces the screen), and with the spot towards the lantern, the slide will be projected correctly on the screen.

A slide worth making is also worth labeling, and for this purpose I know of nothing more satisfactory than the small gummed labels of elongated shape purchasable at a stationery counter in boxes. Generally they come with a little red border around the white space. This may be trimmed off a bit with a pair of shears. It is best to paste the label on the end of the slide where the spot is, and on the same side, following the uniform practice of always putting the label in precisely the same place, to avoid causing any confusion to the operator.

An article on slide-making would be incomplete without reference to colored slides. This is as easy to accomplish — to those gifted with a dexterous touch — as the coloring of prints with transparent colors. The methods of so doing are well described in the book

mentioned a few paragraphs back, and are also contained in the instruction sheets of the best coloring materials now supplied to the photographic trade. Dyes and stains can both be used to good effect, in the manner described by Charles I. Reid in Volume X (1916) of this magazine. Whenever actual values are demanded, slides produced by the Paget or Autochrome process are to be preferred, and are rapidly earning their "place in the sun" of lanternslide procedure. I must say frankly that my readers had best content themselves with the making of black and white slides — and making them well — unless they are adept at the handling of brush and colors.

In concluding, I feel that I should be unjust to readers of this magazine, especially those who have not yet entered upon this most interesting field of slidemaking and projection, if I closed without a word in regard to what I consider the most important departure in this field in recent years. I refer to the introduction of the small lantern and the small slide. Whether the idea was an outgrowth of the moving-picture idea or not I do not know, but the innovation was begun, I believe, by the Victor Animatograph Company, of Davenport, Iowa, who manufacture, besides a stereopticon to take standard slides, a smaller lantern to take small slides about one-third standard size. My own opinion is that the small lantern and the small slide are the thing of the future, not only because of the greater compactness, but because of the natural tendency towards small sizes in cameras. So far as the average amateur is concerned, the era of baggage-train photography is a thing of the past, and when lecturers and travelers learn that a small slide made by contact from a miniature camera negative is just as good as a standard slide made from a negative costing considerably more and involving greater inconvenience because of the greater size of camera, they are, it seems to me, going to gravitate inevitably towards the small lantern and slide.

CHEMICAL LORE FOR THE AMATEUR PHOTOGRAPHER

WILLIAM R. FLINT

CHAPTER IX — PRINTING PROCESSES WITH IRON SALTS (*continued*)

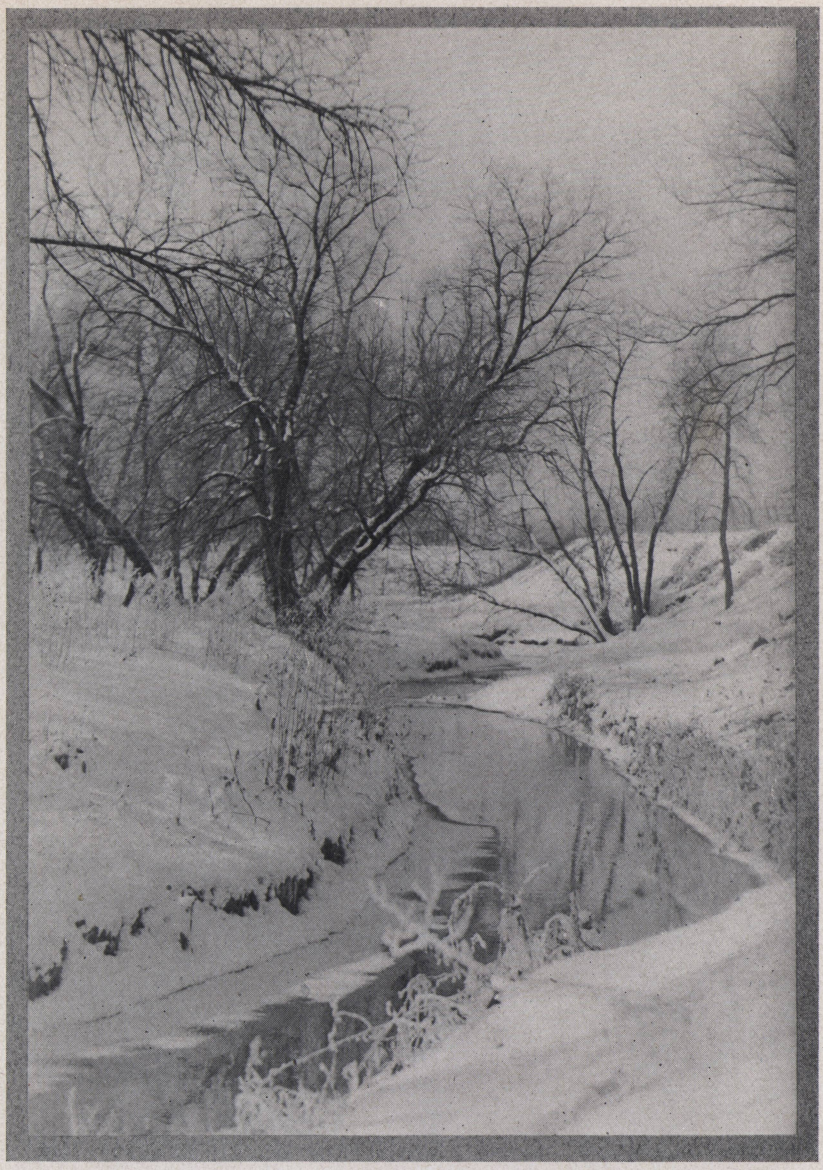
The following formula, suitable for the so-called "cold bath development," is recommended by Abney, not only on account of the keeping qualities of the paper prepared with it, but also because by variations in the developer, the prints can be considerably modified:

NO. 1	
Ferric ammonium oxalate	50 grams
Water, distilled	50 cubic centimeters
Oxalic acid, 10 per cent. solution	15 cubic centimeters
NO. 2	
Potassium chloroplatinite	1 part
Water, distilled	5 parts
NO. 3	
Ammonium dichromate	4 grams
Water, distilled, to	100 cubic centimeters

For each sheet of paper 20 inches by 26 inches, take 8 cubic centimeters of No. 2, mix with 4 cubic centimeters of No. 1, and 8 cubic centimeters of No. 3. Unsized papers must be given a good sizing with gelatine (or arrowroot may be used).

Gelatine	1 gram
Water	100 cubic centimeters
Potassium alum	0.3 gram
Methyl alcohol	25 cubic centimeters

Swell the gelatine thoroughly in the water and afterwards dissolve it by heating, add the powdered alum and methyl alcohol. Filter while hot through muslin, taking care to avoid



THE FIRST SNOWFALL — MRS. MARGARET ANDERSON
Second Prize, November Senior Competition

bubbles. Paper may be treated with the sizing by immersion or by coating with a brush in the manner previously described in the present chapter. In applying the sensitive coating to the paper, it must be remembered that we are dealing with a very unstable mixture. For this reason an ordinary bristle brush will not serve, as it will soon become saturated with the decomposition products of the solution, and these will be transferred to other sheets, with very disappointing results when made into prints. A form of brush, figured and described by Abney, is made out of a 3¼ inch by 4¼ inch piece of photographic film (*i.e.* an old negative), strips of cotton flannel to fit it, and a film clip such as is used for tray development of roll films. A strip of the flannel is laid, fleece out, upon the celluloid, and the ends of both

are then doubled back, without creasing the film, with the cloth on the outside, until they can be firmly held together with the clip. The clip becomes a convenient handle, and the resiliency of the celluloid gives plenty of stiffness without the rigidity which would abrade the paper. For each large sheet a fresh cloth covering must be used, but when smaller sheets of paper are coated, several may be done before renewing the flannel. In any event it is not advisable to use the same piece longer than 10 to 12 minutes. The sheet of paper to be coated may be pinned, the sized side up, at one end upon a board and grasped at the other by the fingers of the left hand. This will allow for the expansion which results from wetting it with the solution. A measured amount of the sensitizing liquid, proportioned to the dimensions of the sheet as given above, is poured upon the middle of the paper and as rapidly as possible brushed with the spreader in circular sweeps out into the corners and over the entire surface. After this the strokes are crisscrossed and all uneven places blended out as much as may be. The next part of the operation consists in the surface-drying of the coated sheet, which is allowed to occur spontaneously, but should not be achieved in under five nor over ten minutes. If dried too quickly the sensitizer will be liable to come off in the developer, but if drying is too slow it may soak into the body of the paper, which produces flat and foggy pictures. When surface-dry, the paper is completely dessicated over a stove at a temperature not too great for the hand to bear (not to exceed 40 degrees Centigrade), this change being indicated by a deepening of the color. The paper, when dry, must be kept dry, which means very dry indeed, since if any moisture is absorbed traces of the iron and platinum salts immediately go into solution. In this condition not only is the ferric oxalate more unstable and therefore liable to spontaneous decomposition, but also as soon as the sheet is exposed to light and the ferric salt begins to be reduced, the solubility of the resulting ferrous salt, although very small, enables the reaction between it and the chloroplatinite to proceed at once and to a more or less indefinite extent, depending upon the actual quantity of water present. For these reasons the prints made from improperly preserved papers are liable to be granular and flat. Platinum papers are therefore commonly stored in tin cylinders with caps which can be made air-tight by wrapping adhesive tape or a wide rubber band around the joint. In the cylinder there is also put a small package of anhydrous calcium chloride, so packed that none of the lime can sift out upon the paper in the cylinder. Calcium chloride, as it crystallizes from water solution, contains six molecules of "water of crystallization." When the crystallized salt is heated, at 200 degrees Centigrade, it loses two-thirds of this water of crystallization, and upon further heating, until the dehydrated salt is melted, the remaining third is driven off, and the product is "anhydrous" calcium chloride. In this condition it has a very great affinity for water, so great that, when a little of it is exposed upon a saucer to the air, in a very short time by the absorption of moisture the salt becomes sticky and soon dissolves in the accumulated water. These reactions may be written:

1. Calcium chloride crystals = Calcium chloride (anhydrous) + Water
2. Calcium chloride (anhydrous) + Water = Calcium chloride crystals

It is by the application of the second reaction that platinum papers are preserved, since the lime salt is so much more hygroscopic than the iron and platinum salts of the paper that all moisture is seized and held by the calcium chloride. But there is naturally a limit to the quantity of water which can be absorbed by a given amount of calcium chloride. When this limit is approached, its efficiency as a dehydrating agent is much lessened and of course when the limit is reached the effectiveness is gone. Therefore in storing platinotype paper it is necessary to consider the condition of the calcium chloride. If it has already absorbed much water, it can quickly be dehydrated by heating in an iron dish. Otherwise fresh anhydrous salt must be taken.

THE SISTERS — WALTER RUTHERFORD

First Prize, November Senior Competition

For producing sepia prints in platinotype, mercuric chloride is included in the sensitizing solution. The brown color of the image is due in some way to the mixture of platinum and mercury reduced by ferrous salt. There are both "cold bath" and "hot bath" sepia papers, the latter being developed in potassium oxalate solution at a temperature between 70 degrees Centigrade and 80 degrees Centigrade (160 degrees Fahrenheit to 180 degrees Fahrenheit). "Hot bath" sepias appear to be rather more permanent than the others, but both are naturally less so than the black papers which contain nothing else than pure platinum. A sensitizer for "hot bath" sepia paper is prepared thus:

NO. 1	
Ferric oxalate	40 grams
Oxalic acid	24 grams
Water, distilled, to	200 cubic centimeters
NO. 2	
Potassium chlorate	0.4 gram
No. 1 solution, to	100 cubic centimeters
NO. 3	
Potassium chloroplatinite	10 grams
Water, distilled, to	60 cubic centimeters
NO. 4	
Mercuric chloride, saturated solution in distilled water	50 cubic centimeters

To coat a sheet of 20 inch by 26 inch paper, take 5 cubic centimeters of No. 1, 4.7 cubic centimeters of No. 2, 9.5 of No. 3, and 1.8 of No. 4. The paper, after printing, is developed

in potassium oxalate solution of the same concentration as that used for the ordinary black process, 26 grams per 100 cubic centimeters, the temperature being maintained at 70 degrees Centigrade to 80 degrees Centigrade, as above noted, over a gas stove, or better on an electric hot-plate. The acid clearing-baths are used at half the concentration given for black prints, that is, 5 cubic centimeters of concentrated hydrochloric acid in each 600 cubic centimeters of the solution.

The many modifications to which platinotype is susceptible not only render the process one of much flexibility when used as a straight photographic method, but also adapt it especially to the use of the artist photographer. Besides the control which is given by variations in the constituents of the sensitizing solution, there are at least three forms of control which can be exercised over the print. In ordinary development the image appears instantly upon application of the oxalate solution. If the surface of the exposed sheet is first smeared all over with glycerine and the print is then brush-developed, as the worker may choose, with a mixture of equal parts of glycerine and developer or with the full-strength developing solution, the normal gradation of light and shade may be altered to any extent desired. The effect of the glycerine is a purely physical one, dependent upon the property of viscosity, in retarding the rate of development. Another mechanical process, for treating the completed print if it has been over-developed, consists in abrading the image, or such portions of the image as may require local reduction, with sawdust and water. A non-resinous sawdust is needed, and that from box-wood is the best. It is shaken up in water and the mixture is poured in a thin stream upon the gently inclined print, the latter being supported by pinning to a board. In this way the shadows may be lightened up and the darkened highlights cleared. The resultant effect has the quality of an engraving. The third method of control is chemical and is the same in principle as the toning processes which were discussed under silver printing. Although, as we have said, the platinum image is essentially a very permanent thing owing to the refractoriness of the element, yet it can be affected chemically by suitable reagents, and for the purpose in hand the same oxidizing agent can be used as is effective in toning the silver image, *viz.*, potassium ferricyanide. Just as in the case of silver, the platinum is oxidized and the ferricyanide is reduced to ferrocyanide. The toning solution contains also uranium nitrate and consequently insoluble red uranium ferrocyanide is precipitated upon the image. Since this is an intensifying operation, the print to be toned should in the first instance be printed light and over-development is to be avoided. Brilliant red tones are secured by taking special care to free the paper from iron salts and to this end an extra clearing-bath or two is advisable.

NO. 1

Uranium nitrate	0.5 gram
Acetic acid (glacial)	3.0 cubic centimeters
Water, to	125 cubic centimeters

NO. 2

Potassium ferricyanide	0.5 gram
Acetic acid (glacial)	3.0 cubic centimeters
Water, to	125 cubic centimeters

Solution No. 1 may be made up in quantity as it keeps well, but No. 2 is unstable and must be prepared just before using. Mix the quantity of No. 2 given with an equal volume of No. 1 and dissolve in the mixture 0.1 gram of sodium sulphite. Leave the print in this solution until the tone is satisfactory, take it out quickly and sponge it, both front and back, with moistened absorbent cotton, and transfer it to an acid clearing-bath containing 5 cubic centimeters of concentrated hydrochloric acid in 600 of water. Pass the print on to a second acid bath, and wash for ten minutes, and, lastly, lay it upon clean muslin to dry. Blue tones

may be had, from the same toning bath, merely by purposely failing to clear all the iron salt from the print immediately after development. Printing should in the first place be carried a little further than would give a normal black and white print. After development, the print is put for but ten seconds into the normal clearing solution and is then placed immediately in the toning bath until colored as desired. Clearing takes place in a solution of half the concentration used for red tones, *i.e.*, 2.5 cubic centimeters of hydrochloric acid in 600 of water. After clearing and washing, the blue print is dried upon muslin, but on no account should the same pieces of cloth be used for both red and blue prints, as the quality of the red will be degraded. It is plain that the blue color is due to ferric ferrocyanide produced by metathesis between the ferric salt which is on the paper and the potassium ferrocyanide reduced from ferricyanide by the platinum. Success in the use of these toning methods depends wholly upon scrupulous cleanliness and the keeping of blue-toned paper away from the red.

THE ICE STORM — GEO. C. EASTON

A process practically identical in principle with platinotype is known as kallitype. Instead of platinum, the image is silver, produced by secondary reduction with ferrous oxalate, the primary image being formed in the iron salt, as is the case in platinum papers. It has been much complained of by photographers and in the photographic journals on account of its alleged lack of permanency. There is no possibility of doubt but that a silver print by the kallitype process may be made equally permanent with silver prints by any other method. When properly worked the process leaves an image in pure silver upon a substratum of pure paper, which is the condition essential to durability. Furthermore, the testimony of time may be advanced, for a certain kallitype print has hung upon the wall of an ordinarily illuminated room for upwards of seven years without appreciable alteration. Any worker who does not get both permanent results and exceptionally pleasing pictures with kallitype

ought to test his chemicals thoroughly and, especially, examine carefully his methods of working, for somewhere in these he is sure to discover the cause. There is one characteristic of this printing medium which ought to make it interesting to a great many amateurs—its exceeding inexpensiveness. It is a fact that, including the cost of the chemicals, paper, developer and fixing salt, the completed prints need not cost more than ten cents per dozen for the 5 inch by 7 inch size. But the quality which it is possible to obtain in kallitype is not at all measured by this cheapness, for successful pictures can scarcely be told from platinum prints. Another advantage lies in the fact that negatives which no other silver process will print satisfactorily will yield excellent pictures in kallitype.

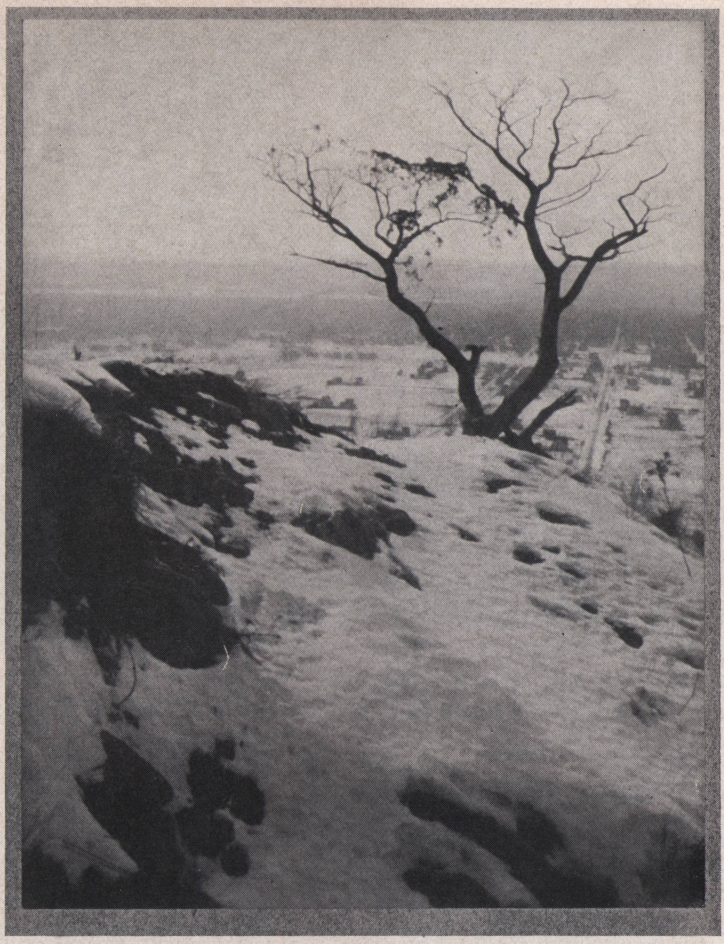
Any kind of paper may be used, with the same proviso as in platinotype, that the unsized varieties must be given a coat of sizing beforehand. The high grade drawing papers are particularly desirable; but for the beginner there is nothing more satisfactory than a good, heavy ledger paper, such as Weston's ledger, since it is already well sized, is very durable, and has surface which gives good quality in prints. As the operations of sizing the paper and coating it with the sensitizing solution are the same as in platinotype, and have just been described, we may pass at once to the preparation of the necessary solutions:

NO. 1	
Ferric oxalate	30 grams
Water, distilled, to	150 cubic centimeters
Gum arabic, selected	3 grams
NO. 2	
Ferric potassium oxalate	15 grams
Water, distilled, to	240 cubic centimeters
NO. 3	
Oxalic acid	15 grams
Water, distilled, to	120 cubic centimeters
Ammonium hydroxide, cencentrated	6 cubic centimeters
NO. 4	
Potassium dichromate	7.5 grams
Water, distilled, to	120 cubic centimeters

All of these solutions are to be made up and kept in chemically clean, dark brown bottles with tight-fitting glass stoppers. Besides this precaution, they should be put away in the dark. Number 1 is prepared by putting the measured quantity of ferric oxalate in the bottle, adding enough water, and shaking from time to time for half an hour. After it has stood in the dark for a day it will generally be found completely dissolved, and when this is the case the gum arabic is added and left to dissolve. The solution is then diluted up to the specified volume with water. It will keep for several months. The other three solutions need no comments. The sensitizing mixture for normal negatives consists of:

No. 1 solution	30 cubic centimeters
No. 2 solution	15 cubic centimeters
No. 3 solution	1.8 cubic centimeters
No. 4 solution	4 drops
Silver nitrate, *pure*	2.2 grams

About 2 cubic centimeters of the mixture are required to coat a sheet 11½ inches by 18 inches. Free nitric acid in the silver nitrate is detrimental and should be tested for with litmus paper beforehand. The salt may be purified by recrystallization, if necessary. Special sensitizers can be prepared for different kinds of negatives. For example, for very contrasty negatives, No. 4 may be omitted and No. 2 and No. 3 increased, and more silver nitrate added. Too great increase in the proportion of No. 3 induces fog. For negatives that are very soft and thin No. 4 may be increased, diminishing the quantity of No. 3. However, it is generally better to use a uniform sensitizer and exercise the necessary control by modifications in printing and development. The coated paper will keep in good condition for a month



WINTER LANDSCAPE L. M. A. ROY

without any special precautions except against exposure to light. If it is desired to preserve it longer, it may be stored in the same way as platinum paper with anhydrous calcium chloride as a dehydrating agent.

After printing, which is similar to platinum, development is brought about in a solution of sodium acetate, variously modified according to the tone which is wanted. The acetate solution, 125 grams of the solid dissolved and diluted to one liter, can be made up in bulk, as it works best when a day or two old. For warm blacks, take:

Acetate solution	240 cubic centimeters
Tartaric acid	0.75 gram
No. 4 solution	0.6 to 6.0 cubic centimeters

The longer the exposure or the flatter the negative, the greater should be the proportion of No. 4 solution used, as potassium dichromate appears to act somewhat as a restrainer. For platinum black tones take:

Acetate solution	240 cubic centimeters
Tartaric acid	1.5 gram
Phosphoric acid (50 per cent.)	1.2 cubic centimeters
No. 4 solution	0.6 to 3.0 cubic centimeters

To make sepia prints with kallitype, the developer contains borax and Rochelle salts:

NO. 5

Water, distilled, hot to	1,000 cubic centimeters
Borax, powdered	37.5 grams
Sodium-potassium tartrate	75 grams

NO. 6

Sodium-potassium tartrate	75 grams
Water, distilled, to	1,000 cubic centimeters

In making up No. 5, dissolve the borax in the hot water, let it cool, and finally add the tartrate, and dilute to one liter. Sepia tones are obtained by mixing these solutions in the proportion of one part of No. 5 to three parts of No. 6, and adding No. 4 as required.

Kallitype prints must be both cleared of iron salts and fixed in thiosulphate solution, and it is in the last operation that the process differs from platinotype. The kind of clearing-bath to use depends upon the developer. Following immersion in sodium acetate solution, prints are cleared in a bath, made fresh each time:

Sodium citrate	7.5 grams
Citric acid	1.5 gram
Water, to	250 cubic centimeters

After the borax and Rochelle salts developer, use a solution of Rochelle salts, 75 grams to the liter of water, to which are added 7.5 cubic centimeters of No. 4 solution. Leave the prints in this bath for ten minutes. After coming out of the clearing-bath, they must be thoroughly washed to free them from all traces of acid, since this would cause decomposition of the thiosulphate fixing bath which follows. They are then fixed for ten minutes in:

Sodium thiosulphate	25 grams
Water	500 cubic centimeters
Concentrated ammonium hydroxide	5 cubic centimeters

and given a final thorough washing until all thiosulphate has been removed. After this the prints are dried, best between lintless photographic blotters, to keep them free from dust.

In this chapter the attempt has been made principally to give an outline of the processes with ferric salts, showing as simply as possible the rationale of the methods and describing in an elementary way the chemical reactions upon which they depend for making technically successful prints. It is possible that some readers, at least, may become sufficiently interested to wish to pursue the subject further. Such may find in the accompanying bibliography full and practical accounts for handling these beautiful photographic media.

(To be continued.)

For the benefit of readers who join us with this number, the first in Volume XI, it should be said that "Chemical Lore for the Amateur Photographer" ran serially through Volume X, and may be secured entire by purchasing back numbers, if desired. However, the same matter is now published in book form under the title of "Chemistry for Photographers," and may be secured from our publishers at $2.00. As the price of the back numbers is practically the same as that of the volume, most readers will probably prefer to secure the latter, which is well bound in cloth and makes a most satisfactory addition to the library, besides being more convenient for reference in the workroom, if the experiments are conducted.

MT. SIR SANDFORD *Courtesy of Howard Palmer*

PHOTOGRAPHIC SURVEYING IN CANADA*

M. P. BRIDGLAND, *Dominion Land Surveyor*

THE accurate survey of broken and lofty mountains is a task as difficult as the geographic results are interesting. The methods employed have varied with available appropriations, the limitations of topographer and instrument, and the character of the relief. The military engineers of a number of European countries, notably Italy and Austria in their Alpine domains, have done admirable pioneer work. Although in practical use for nearly forty years,† the photographic method has been brought to a high state of perfection during the last ten or fifteen years. The following account gives an analysis both of the method and of its application to types of relief and climate that have baffled Dominion topographers ever since the survey of the rough lands of the western Cordillera was begun.

In western Canada there are large areas of broken country varying in elevation from low rolling foothills to snow-clad mountain ranges rising ten to eleven thousand feet above sea-level. The mapping of such country offers many difficulties. Ordinary methods of survey are impossible, except for very limited areas, and almost prohibitive owing to excessive cost.

In order to meet these difficulties, the method of photographic surveying was adopted, in the year 1886, by Dr. E. Deville, Surveyor General of Dominion Lands. In that year an extensive survey of the Rocky Mountains along the main line of the Canadian Pacific Railway was inaugurated. Since then the photographic method has been used in many localities.

Photographic surveying may be used in any class of country where the topographic features are sufficiently marked to appear clearly in the photographs. The method is,

*Reprinted by courtesy of *The Geographical Review*.

†It may be of interest to note that one of the earliest applications of the method was made by W. Jordan in his survey of the oasis of Dakhel during Rohlfs's expedition to the Libyan Desert in 1873-74, mentioned in the May *Review*, p. 349 and footnote 2.

however, best adapted to rugged country, such as the high mountain ranges of British Columbia and western Alberta. Here the season during which climbing may be accomplished with safety is short, and climatic conditions are often unfavorable. High winds, storms, clouds, and extreme cold are the rule, so that work must often be done hurriedly and under great difficulty.

On Canadian photographic surveys the essential instruments are a camera and a small transit. These instruments are of the simplest possible form. In this respect they show a marked contrast to the complicated designs of most European instruments.

The camera consists of an oblong metal box, open at one end and fitted into a strong outer wooden case. The metal box carries the lens and two sets of cross-levels which may be read through openings in the outer case. Inside the box there are two sets of diaphragms, and a shade is placed over the lens, when a plate is exposed, in order to eliminate all superfluous light. The instrument stands on a three-screw base, identical with that of the transit, so that the same tripod may be used for both. The camera may be used with the long side either horizontal or vertical. In the horizontal position the lens has a field of about fifty-one degrees and in the vertical of about thirty-six degrees. The extent of the field is shown by lines ruled on the case. The size of the plates is 4¾ x 6½ inches. The carrying case is made to hold the camera and twelve single plate holders. The total weight of the case with the camera and twelve plates is about twenty pounds.

The transit is a light instrument of the ordinary pattern, made by Troughton and Simms, London, with 3-inch horizontal and vertical circles reading to minutes. The tripod has extension legs, three feet four inches long when extended, and 20 inches long when closed. When in use a bag is suspended between the legs and filled with stones, and the legs and bag are further blocked with stones so that it is rigid in any wind. For packing, the head is taken off and placed in the transit box, while the legs are placed in a canvas case designed to hold the box and the legs. The canvas case is fitted with shoulder straps for carrying. The total weight of the instrument complete is about fifteen pounds.

Owing to the excessive contrasts of Alpine scenery, ranging from snow in sunlight to deep and heavily timbered valleys in shadow, it would be impossible to get good photographs with an ordinary camera and lens. Moreover, there is always a certain amount of diffused light which tends to obscure the distant details. The remedy for the former is a plate having great latitude of exposure, and for the latter an orthochromatic plate with a yellow screen. In the last few years the Cramer "Slow Isochromatic" has been the plate principally used on Canadian surveys. The Seed "L Ortho" has also given good results. In the beginning of the season of 1915, the Canadian cameras were fitted with Tessar lenses and Wratten and Wainwright "G" filters. Along with these, Wratten and Wainwright "Panchromatic Plates" were used and gave satisfactory results.

When in the field, it is important to select those points which give the best views of the surrounding country. This does not mean that the highest peaks are always the best. In photographs taken from a very high peak, the surrounding country often appears dwarfed, and the details do not show up as well as in those taken from a more moderate elevation. It must also be remembered that the higher the peak, the longer the ascent is likely to take, and the greater the likelihood of encountering sudden storms. Frequently very useful views may be obtained with little trouble from points of comparatively low altitude.

It is customary to take enough views from each peak to cover the complete circuit of the horizon. This means very little extra work for the surveyor in the field, and the extra views are often of assistance in the office. It seldom happens, however, that all the views can be taken from a single point. Usually one or more camera stations are required on different

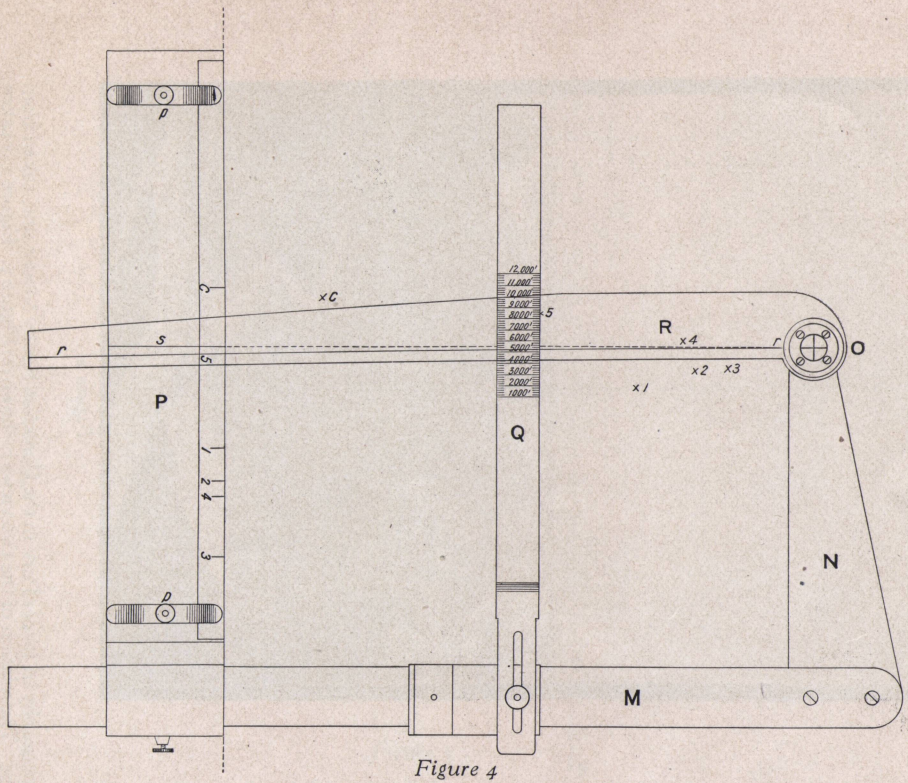


Figure 4

parts of the peak. As a rule these may be located by reading angles on them from the central point and measuring the distance with a light tape. Angles must be read on at least one well-defined point in each view, preferably on two. The angle of elevation or depression should also be read on these points, as it will serve to check the horizon line of the view if there should be any trouble in the office. It must also be constantly remembered throughout all the field work that all the country to be mapped must be seen from at least two points which subtend angles great enough to give satisfactory intersections and not too great to permit easy recognition of the same points as they appear in corresponding photographs, taken in pairs, one from each station.

For plotting purposes bromide enlargements approximately 10 x 14 inches in size are made from the negatives. To obtain satisfactory results, the enlarging must be very accurately done. This work is done at Ottawa with an enlarging camera made especially for the purpose.

In the office the triangulation is plotted by ordinary methods, depending on the nature of the control. This may vary from a precise triangulation to a reconnaisance survey, where the triangulation and the photography are carried on at the same time. Elevations of the stations and more prominent peaks are computed from the angles read in the field. Where necessary, corrections are made to allow for curvature and refraction.

Views from different stations showing the same country are then selected. Sufficient points are identified on each of two corresponding views taken from the different stations to show clearly the topography of the country. These points are then plotted on the plan and their elevations calculated from the photographs. Using these points as a guide, and with the photographs in front of him, the topographer is able to draw in his contours with an

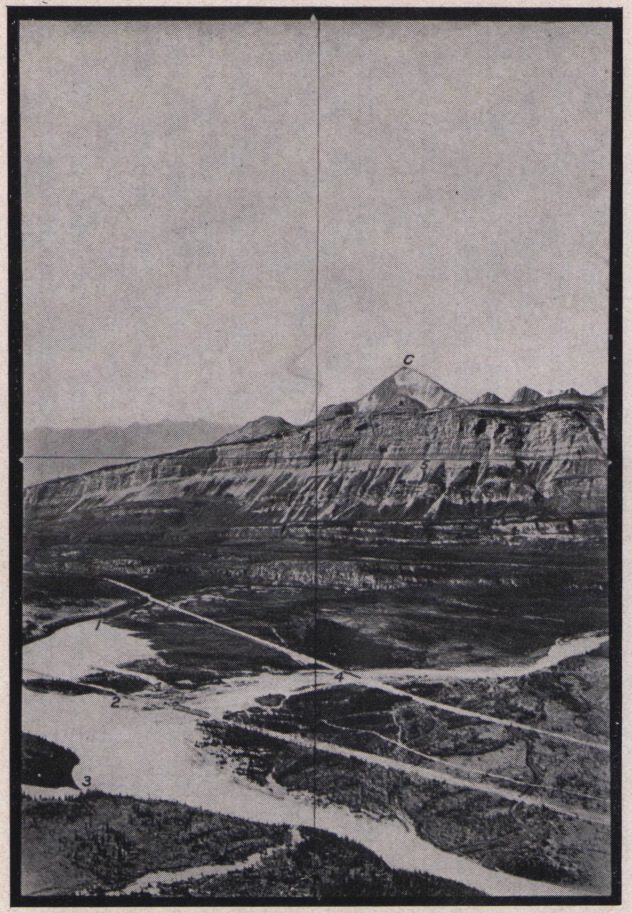


Figure 1

Figure 2

FIGURES 1 and 2—Two partially overlapping views of rugged topography in Jasper Park in the Canadian Rocky Mountains, taken from two different stations with a camera equipped for photographic surveying. The relation of the two views is shown on Figure 3. Figure 1 is taken from the station marked B, and Figure 2 from the station marked A on that figure. The numerals 1 to 5 represent the same objects in both views and correspond with the points so numbered on Figure 3. The ruled network in the foreground of Figure 2 likewise corresponds with the network of squares in Figure 3.

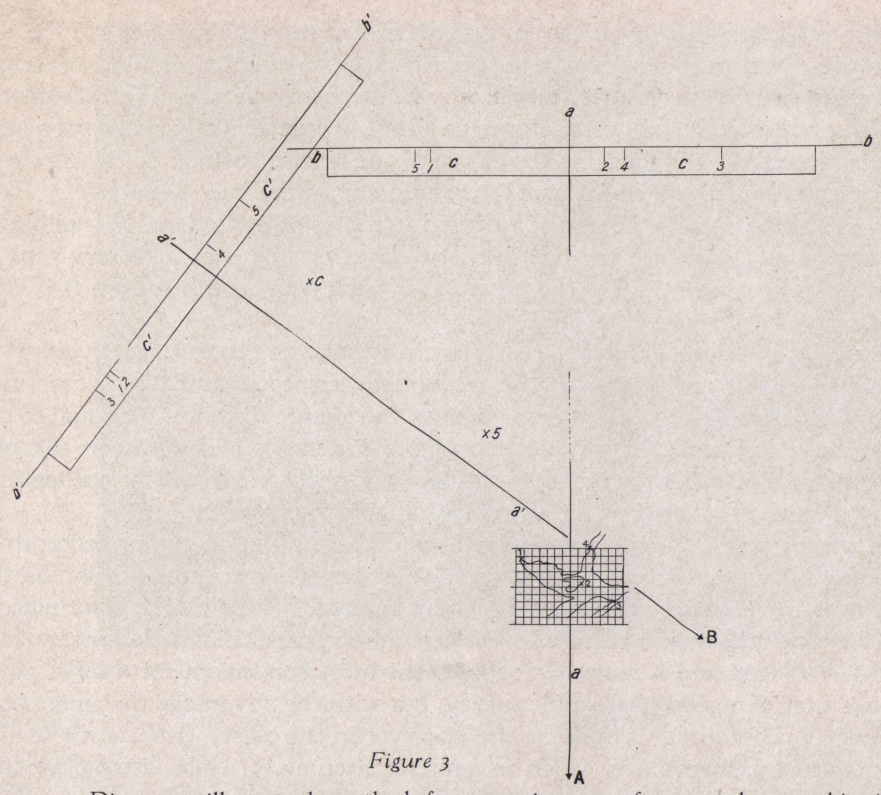


Figure 3

FIGURE 3—Diagram to illustrate the method of constructing a map from two photographic views. For explanation, see the text. In practice the distance from *A* to *bb* and from *B* to *b'b'* is made equal to the focal length of the views and the distances of *1*, *2*, *3*, *4*, *5*, etc., from *Aa* and *Ba'* respectively are made equal to the distances of these points from the principal lines of the corresponding views.

accuracy dependent chiefly on the number of points plotted and on the scale of his plan.

Figures 1 and 2 represent views from two stations shown as *A* and *B* in Figure 3. On these views, points *1* to *5* have been identified to illustrate the method of plotting. The principal and horizon lines, whose positions have been determined during the season, are first ruled on the views. The traces of the principal line and of the picture plane for each view are then laid down on the plan as shown in Figure 3, *aa*, *bb*, and *a'a'* and *b'b'* representing these traces respectively for Figures 2 and 1. The distances of the identified points from the principal line are then taken off on a slip of paper, a separate slip being used for each view. These slips are then placed on the traces of their respective views as shown by *cc* and *c'c'* in Figure 3. The line of sight to any point is then given by drawing a straight line from the station to the projection of the point as shown on the slip. By inserting needles at *A* and *B* and using fine silk threads or hairs, instead of actually drawing lines on the plan from each station, the intersections may be determined very rapidly.

The elevations of the points are taken out by means of the instrument shown in Figure 4, which was originally devised by Messrs. D. B. Dowling and H. Matheson of the Canadian Geological Survey. The arms *M* and *N* are of brass fastened rigidly together. *P* and *Q* are sliding bars, moving on the arm *M*. *R* is a swinging arm revolving around the center *O*. *P* and *R* are made of transparent celluloid, and on *R* a fine line *rr* is ruled radiating from the center *O*. The arm *Q* carries a scale corresponding to the scale of the map. The instrument must be made accurately so that, when the line *rr* is over the line *s*, the reading of the scale will be constant when moved along the arm *M*.

When using this instrument the center *O* is placed over the station, and the arm *P* is placed so that the edge coincides with the trace of the view, the line *s* falling on the principal line. The instrument is then held in place by heavy paper-weights. The distances of the points above or below the horizon as shown on the view are taken off on a slip of paper. The slip is then placed on *P*, as shown in the diagram, and held in position by the clips *p p*. The scale is now set to read the elevation of the station when the line *rr* is above *s*. To obtain the elevation of the point *5* the arm *Q* is moved to the point plotted and *R* is moved so that *rr* passes through *5* as shown on the slip. The elevation of the point is now read directly off the scale. To avoid mistakes the elevation of each point is taken from two views and the mean of the two elevations is used.

Relatively level topographic features such as swamps, lakes, and rivers with comparatively small fall are plotted by means of the perspectometer. This consists of the perspective of a series of squares drawn on glass, having the distance line equal to the focal length of the photograph. The projection of the squares is laid down on the plan, the perspectometer is placed in its proper position on the photograph and the outlines drawn in square by square. This method is illustrated in Figures 2 and 3.

The accuracy of a photographic map depends first of all on the precision of the triangulation. After that, it is dependent on the number of camera stations and on the scale of the plan. Any scale or contour interval may be used. These will be determined by the purpose for which the map is required. For general purposes, the writer considers a contour interval of 100 feet and a scale of 1:40,000 the most convenient for a large plan. The precision is that of a good plane-table survey, but with the advantage that more points are plotted and the contouring is done by the surveyor in the office, with the views from the different stations before him to which he can refer alternately, while with a plane table this simultaneous comparison is entirely wanting.

The most tedious and tiresome part of the work is plotting the points and drawing the contours. The office work requires at least twice as long as the field work. This is not a defect, but one of the greatest advantages of the method, for the field work, which is most expensive, requires much less time than when any other method is used.

A party of seven can work to the best advantage under most circumstances. The party consists of the surveyor, his assistant, and five men, two of whom should be expert packers, if pack horses are used. With two sets of instruments, the surveyor and assistant surveyor, each accompanied by two men, are free to work in the same or different localities, the cook being left in charge of a main camp at some central point. Except on long or dangerous trips one man is enough to accompany the surveyor when actually climbing. If in a country unusually difficult of access, extra help may be advisable.

As regards the cost of the work, it is impossible to give any accurate estimate. The

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Recent expositions of the subject are:

E. Deville: Photographic Surveying, Including the Elements of Descriptive Geometry and Perspective. Ottawa, 1895.

J. A. Flemer: Phototopographic Methods and Instruments, *Appendix No. 10* (pp. 619-735), *Rept. Superintendent U.S. Coast and Geodetic Survey for Year ending with June, 1897*. Washington, 1898.

A. Laussedat: Recherches sur les instruments, les méthodes et le dessin topographiques, Vol. 2 (in two parts). Gauthier-Villars, Paris, 1901 and 1903.

S. Finsterwalder: Die Photogrammetrie als Hilfsmittel der Geländeaufnahme, in "Anleitung zu wissenschäftlichen Beobachtungen auf Reisen," edit. by G. von Neumayer. 3rd edit., Jänecke, Hanover, 1906.

S. Finsterwalder: Photogrammetrie, in "Encyklopädie der mathematischen Wissenschaften," Vol. 6, 1, No. 1. Teubner, Leipzig, 1906.

W. Jordan: Handbuch der Vermessungskunde, Vol. 2, Chapter 16. 7th edit., Metzler, Stuttgart, 1908.

F. V. Thompson: Stereo-Photo Surveying, *Geogr. Journ.*, Vol. 31, 1908, pp. 534-551.

H. M. Wilson: Topographic, Trigonometric, and Geodetic Surveying, Chapter 14. 3rd edit., Wiley, New York, 1912.

MT. WHEELER AND MT. KILPATRICK *Courtesy of Howard Palmer*

cost depends, in the first place, on the nature and accessibility of the country and, in the second place, on the class of work required. Much also depends on the season, as more or less time is always lost through smoky, cloudy, or rainy weather. The approximate cost of the writer's survey of the Crowsnest Forest Reserve in the years 1913–14 was $9.50 per square mile. This may be considered a fair average.

The following is a list of the principal photographic surveys made in Canada. The areas given are only approximate, particularly in the case of the earlier surveys.

Locality	Area Surveyed in Sq. Miles	Year	Surveyor
Main range of the Rocky Mountains adjacent to Canadian Pacific Railway	2,500	1886–92	J. J. McArthur
Columbia River valley from Revelstoke to Arrowhead	600	1897	J. J. McArthur
Alberta foothills south of Calgary	2,000	1896–99	A. O. Wheeler
Crowsnest coal area, near Crowsnest Pass, B.C.	550	1900	A. O. Wheeler
Selkirk Mountains adjacent to Canadian Pacific Railway, from Beavermouth to Revelstoke	1,100	1901–02	A. O. Wheeler
Rocky Mountains adjacent to Canadian Pacific Railway, from Mt. Castle to Beavermouth	2,200	1903–06	A. O. Wheeler M. P. Bridgland
Rocky Mountains, Robson district, north of Yellowhead Pass	1,100	1911	A. O. Wheeler
Rocky Mountains, Banff-Windermere road from Vermilion Pass to the junction of the Kootenay and Vermilion Rivers	500	1913	R. D. McCaw
Crowsnest Forest Reserve, southwestern Alberta	1,500	1913–14	M. P. Bridgland
British Columbia—Alberta boundary	1,500	1913–15	A. O. Wheeler A. J. Campbell
Okanagan Lake district, British Columbia	1,000	1914–15	R. D. McCaw
Jasper Park adjacent to Grand Trunk Pacific Railway	800	1915	M. P. Bridgland
British Columbia—Alaska boundary	5,000	1893–1913	Dr. W. F. King
Southern boundary of British Columbia	1,200	1903–05	J. J. McArthur
Yukon-Alaska Boundary (141st meridian)	1,000	1907–13	J. D. Craig
Thirty-one-Mile Lake watershed, Quebec	200	1913	D. H. Nelles
Reconnaisance surveys by the Geological Survey	9,000	1904–15	

BOBBIE'S CAMERA OR THE MAGIC PICTURE BOX

A Series of Pictures and Verses Depicting the Adventures of a Small Boy With His First Camera

BOBBIE MAKES HIS BOW

Young Bobbie, as a hunter bold,
Prepares to brave the fray,
To shoot, not with a wicked gun,
But in more peaceful way.

His weapon is a simple box,
Containing naught of fear,
No pain or sorrow lurks within,
Just sparkling, sunny cheer.

So let him shoot, and show to you
The products of his art,
Which Bobbie says, "Though oft a-miss,
Come from a loving heart."

FOREWORD

THIS series is not intended, by any means, to ridicule the art or practice of photography, but only to point out, in a humorous manner, the many blunders that the innocent camera is heir to in the hands of a beginner entering into the mysterious realm of things photographic. It is not many moons since we all, even the best of us, trod the same uncertain pathway of open pitfalls, in which Bobbie's little feet are so innocently, though fearlessly, plodding; if some of his productions are deemed too absurd for actual possibility, it is only necessary for us to turn our eyes backward along the twisting, turning byways of past personal performance to easily recognize some of our own misfire masterpieces. The only difference is that, while we were either too proud or too modest to parade our mistakes, Bobbie cheerfully exhibits his for the benefit of all those who do not wish to do likewise.

WILLIAM LUDLUM, Jr.

ROLL THE FIRST

He first attacks the camera biz
By shooting at the human phiz;
He poses Uncle, prim and neat,
And, you'll admit, 'tis quite a—feet.

Aunt Kate, beguiled to strike a pose,
Is "snapped," regardless of her hose,
But, when your eye upon this lands,
You'll see, 'tis mostly hose and—hands.

Young Bobbie, grown by now discreet,
And 'ware of making pictured feet,
Again on Uncle's phiz does land,
Resulting in a—stunning hand!

He next his home attempts to take
And surely, now, a hit will make;
But Bobbie can't tell what he did
To make his house a—pyramid!

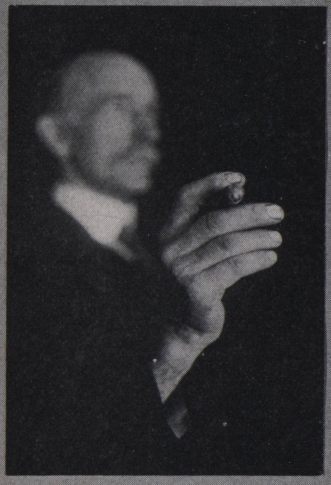
Here Bobbie tries to stop a train—
But it keeps on, with might and main;
The train is just a passing streak,
On Bobbie's list—another freak!

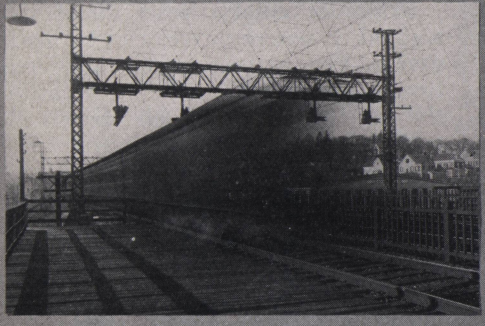
Against the shade Aunt Sue is posed,
The shutter quickly opened—closed;
Another obstacle is met,
And Bobbie's made a—silhouette.

William Ludlum, Jr.

Bobbie's Camera

Roll the First





THE WINDING STREAM — S. H. NISSLEY

A TIME-HONORED CUSTOM

Here it is again — the first day of a new year — the day for making resolutions. Looking back over your experiences in the past year, what need for improvement can you see? Regardless of other needs, we can divine one pressing thought which will be in the minds of a great majority of readers. Each and every one will say, "I waste much more material, and lose more valuable pictures as a result, than I should. I must try to do better this year." "Doing better" will be accomplished largely by being more systematic, and observing the relation of cause and result. If a negative or print fails to give satisfaction, study it a moment and note what mistake was made, before dropping it in the waste basket. But more important than anything else, put your work on a systematic basis. Use an exposure meter; adopt a method of development of some sort; observe cause and result, good and bad. It is the only method by which consistent results will ever be assured or the worker avoid disappointment. If you have any friends who are starting a photographic career, or have a new camera, you can do them a good turn by explaining to them that it is really economical for them to read a textbook or two, and buy a good exposure meter, and start right. Wasted material soon mounts up in cost much greater than that of books and meter, but the most vital reason for starting right is that many pictures can not be taken a second time, so that the loss of a film represents much more than the few cents it costs.

If we were to select a set of books for a friend or beginner, we should advise reading in the order given: *Practical Photography No. 1*, "The Secret of Exposure"; *No. 2*, "Beginners' Troubles"; Watkins' "Manual of Photography"; and for the field a copy of our vest-pocket edition of the American Photography Exposure Tables. We do not give this advice because we think primarily of selling these books, but because we know every reader will have more satisfaction and happiness with his camera if he will make use of the practical information given in the four volumes. All told they cost $1.35, a small premium to pay to assure success in picture making. Other books of a similar nature will do as well; the point is: Know thy camera and how to use it.

PRINTS FROM WET NEGATIVES

Prints or enlargements direct from unwashed or wet negatives can be made quite easily. For contact prints, after removing from the hypo bath, rinse the negative under the tap, and swab off all surplus moisture with a tuft of cotton batting. Place the negative in the printing frame as usual, film side up, and lay a sheet of thin clear celluloid over it. This will protect the emulsion and prevent the paper from sticking. The celluloid should be of the very thinnest obtainable, so that the definition of the print will not be lessened; photo supply dealers can supply or secure it in cut sheets. After the prints have been made, the celluloid should

AT THE FOOT OF THE ROCKIES — JOHN HABERSTROH

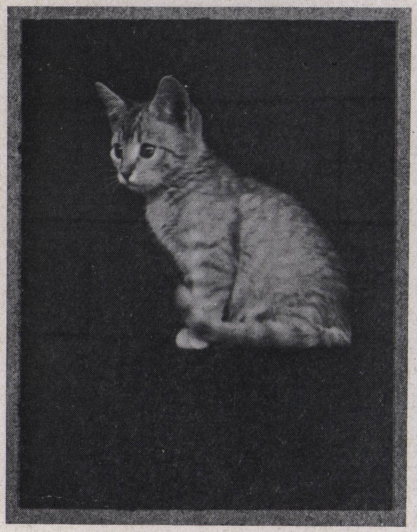
be stripped from the plate, which should then be replaced in the wash water and finished as usual. Prints of any size can be made with the enlarging lantern, but as heat is likely to melt the emulsion, the plate or film should advisably be soaked for a moment in pure grain alcohol before being placed in the lantern. Film negatives should be placed between two sheets of thin, clear celluloid, so that after the prints have been made the celluloid can easily be stripped from the negative. If placed directly between two pieces of glass, it may prove impossible to separate the glasses without injury to the emulsion of the negative. Do not use wood alcohol or formalin on the film negative that is to be treated in this manner.

PHOTOGRAPHING SILVERWARE

Another handy use for that convenient roll of magnesium ribbon is to burn a strip of it beneath a piece of silverware so that the white smoke will envelop the article. It will be found that the smoke will form a white deposit on the silver, and the coating will be sufficiently heavy to kill all reflections that make the photography of such objects difficult. Another method more frequently advocated is to rub putty, or rather to daub it over the surface of the silver so that the reflections are entirely avoided. This is a somewhat undesirable performance, as the putty generally manages to smear everything around it as well as the silver. For photographing a silver container, it is possible to make use of a physical phenomenon: cracked ice and a pinch or two of salt placed in the vessel, and water poured in up to the brim will cool it to such a point that dew will deposit on the outside. Sometimes none of these means can be attempted, and the silverware must be photographed without any aids to avoid reflections. In such case the only controllable factor is the lighting, a very important factor too, since upon its direction depends the reflection that can destroy the proper range of tones in the negative and make the print look like anything but a representation of silver. The light should come from about forty-five degrees to the front and above, as in the case of the average still-life study. Exposure should be very full to make the result soft and avoid any suggestion of surfaces with an uneven polish.

AT THE FOOT OF THE ROCKIES

A most beautiful landscape view, made with a Kodak, without previous preparation — surely users of film cameras can assure themselves that given the time and the



BRIGHT-EYES A. E. FOLLOWS

place, their instruments are capable of producing results on a par with those made with more elaborate equipment. Whenever the old question of "plate or film?" is under discussion, a few pictures of this sort are ample to prove that a compact little film camera can hold its own. Mr. Haberstroh did not furnish full data, but we assume that a filter was used, and that light and atmospheric conditions made a snapshot permissible.

HEALTH AND THE DARKROOM

Photography is fast becoming very automatic in its various processes, but there are many serious workers who find a darkroom indispensable. For them a few facts about hygiene in the darkroom will not be out of place. A poorly ventilated darkroom is the cause of depression and headaches. When experimenting with any chemicals that fume or are strong smelling, ventilation is an absolute necessity. Acid fumes and those arising from potassium cyanide are particularly dangerous. Even when present in small quantities, the membranes of the eyes, nose and throat will be affected. Acids such as sulphuric, hydrochloric, and nitric will burn badly and destroy fabrics with which they come in contact; care must be taken not to spill them on the clothes, but as an ounce of prevention is worth some pounds of cure, it is best to wear an apron or old clothes in the darkroom. Weak eyes are often much irritated by the red light in the darkroom. Have all the light possible, and so lessen the chance of eyestrain. If the aching persists, a weak solution of warm boracic acid can be applied to the eyes with a clean handkerchief or cloth. Some people find relief in an application of salt water.

BRIGHT-EYES

On another page we have reproduced a photograph of one of Miss Elizabeth Wotkyns' pets. The little picture on this page is reproduced from a contact print such as Miss Wotkyns' would have had, had she not resorted to the use of the enlarger. We print the two, for the sake of comparison, to again hammer home the point we have made on other occasions that, given a good negative with a portion of unusual interest, the ability to enlarge that portion is a valuable pictorial asset. In this case, we believe that Mr. Follows has a negative of greater possibilities than Miss Wotkyns secured, but the use of the enlarger gave the latter a decided advantage. We hope this very practical demonstration of our remarks will induce more readers to buy or construct enlargers during the winter months. If unfamiliar with the process or in need of plans for constructing an enlarger, get a copy of *Practical Photography No. 5*, "How to Make Enlargements," from us or from your dealer.

A COPYING HELP

It sometimes happens that it is necessary to paste several pictures on a single sheet of cardboard and make a large copy negative so that prints of the entire group can be made by contact from the large negative. It will usually be found that, if there was any great difference in the original small negatives, the large copy negative will not do justice to every one of the small pictures, even though the best possible prints were made from the small negatives before mounting. It will probably be found also that there will be parts which will need holding back and others which will need forcing. By backing the negative with a sheet of ground glass, and working over it with pencil, the different individual groups can be made to print the same depth and be as satisfactory as the original contact prints from the small negatives. If it is wanted to have the individual pictures appear on a white ground, the emulsion side of the negative can be blocked

THE END OF THE DAY — WARREN R. LAITY

Third Prize, November Senior Competition

out with binding strips (lanternslide tape) around the edges of the pictures, the space between being filled in with opaque. On the back of the negative the ground glass is fastened with the ground side out, and penciled over wherever necessary to hold back the light, occasionally making proof prints to check up the work. By following this method, it is possible to equalize entirely any difference in the contrast of the original prints and to produce a finished result of equal brilliance and detail in all prints.

THE DEVELOPING PERIOD

There is a method by which prints can be made on gaslight papers with absolute uniformity of color and contrast. Most makers of gaslight paper prints find them varying according to the season of the year — and fail to understand the reason. The reason is that the paper must be completely developed; that if underdeveloped, it will be muddy and brown or lacking in detail — according to the exposure given, and if overdeveloped, it will lack detail in the highlights, and possibly be fogged all over. The object, then, is to find out when the paper is completely developed. To do this is quite simple. Make up a fresh developer and bring it to the temperature recommended by the manufacturer of the paper. Under the darkroom light, open a package of paper and cut a sheet or two into strips one inch wide. Immerse one-half of a strip in the developer for 30 seconds, and then place it in the fixing bath and rock the tray for a few seconds. Then take other strips and treat them in the same fashion, only with increasing exposures of 35, 40, 45 seconds, respectively, and so on until a point is reached in which the paper plainly darkens as watched under the safe light — which, by the way, must be especially safe in making this test. The strips should be marked with the number of seconds developed, so that they can be distinguished when removed from the fixing bath, washed, and dried. Then examine them to select the strip which has been developed longest without showing any trace

of fog — in other words, the developed half is the same tone as the undeveloped half. This is the limit of the developing period, and when a print has been developed that long, it has been fully developed, the temperature of the developer being the same as that used in making the test, and the formula being constant. For safety's sake prints should not be developed quite that long; for instance, a paper which can stand 50 seconds' development without fogging will make a satisfactory print if developed about 30 seconds. If so exposed that the print develops to have full detail and brilliance in from 30 to 40 seconds, it will be a good print. If overexposed so that it must be jerked from the developer because it will become too dark if left over 30 seconds — common procedure among commercial finishers — it will not be a good print, because it has not fully developed. Again, if underexposed so that detail and brilliance has not been produced at the end of 40 seconds' development, it is obvious that if it is left in the developer much longer, it will begin to fog. Consequently, in using any brand of paper, the careful worker will ascertain how long it may remain in a given developer at the right temperature, and will work close to the safe limit as far as possible.

DEVELOPING PROBLEMS

J. J. H., Champaign, Ill., asks how much more water a tray-developing formula for negatives requires when used by the tank method for twenty-minute development. He also wishes to know the factor numbers for the different developers when using the factorial method of development.—There is no rule of thumb method for determining the necessary dilution to produce a solution that will develop a plate or film in twenty minutes. As tray formulas differ radically, it is not possible to dilute a tray developer with a certain amount of water, the same amount in all cases, and produce a twenty-minute tank developer at normal temperature. In fact, a diluted tray developer may not be suitable at all. And, in addition, our friend takes no account of temperature. We therefore recommend a copy of Watkins' Manual, which goes into the theory of the makeup and use of the developer thoroughly. As our friend is evidently not acquainted with these fundamentals, we cannot explain the reason that the developer cannot be arbitrarily diluted. The volume mentioned contains a complete list of the factors of the different developing agents and explains how they may be combined, and how to figure the factor of any combination. If not particularly interested in the factorial system of development, but rather desirous of having a developing formula that can be used equally well for tray or tank, merely changing the amounts of water, our friend should have one of our Thermo Development cards. This gives formulas for pyro-soda, metol-hydrochinon, and duratol-hydrochinon stock solutions, which may be diluted to an indicated amount for either tray or tank development, using any plate on the American market, only one temperature table being necessary. All information is given on the front of the card, which is eyeletted so that it can be hung conveniently in the workroom.

REMOVING PYRO STAIN

Pyro-stained negatives and fingers are a constant source of trouble to all of us. Many times the stain is so pronounced that it seems necessary to remove it, and when this is attempted, the persistence of the color leads one to quote Lady Macbeth—vigorously. Ilford, Limited, of England have disclosed their method of removing pyro stain, which they state is employed by them with great success. The stained negative should first be hardened by placing in a weak chrome alum solution containing one grain per ounce, unless the negative has been dried prior to treatment, as the film is otherwise likely to soften during the process. It should then be soaked for ten minutes in the following solution:

Potassium permanganate	50 grains
Common salt	¼ ounce
Acetic acid (glacial)	1 ounce
Water, to	20 ounces

After a brief wash it is transferred to the following solution:

Potassium metabisulphite	1 ounce
Water, to	20 ounces

in which it is kept until the image is white everywhere to the back of the film, indicating that it is sufficiently cleared. The image is then redeveloped in any non-staining developer such as amidol or hydrochinon, when a good neutral black deposit with clean shadows is produced. All the processes are performed in daylight. The bleaching solu-

THE ICE MAN'S HARVEST — MRS. MARGARET ANDERSON

tion seems to require about ten minutes to bleach a badly stained, heavily coated, and dense negative; for that reason, as it is impossible to tell by inspection whether bleaching is complete, it is best to arbitrarily place the bleaching period at ten minutes and so be certain that it is sufficient. If insufficiently bleached, the fact will be evinced by the persistence of the stain after immersion in the metabisulphite solution, in which case the bleaching solution should be reapplied and the image again cleared in the metabisulphite solution prior to re-developing it. It is very essential that the tray be constantly rocked when the plate is being bleached. This same method may be used to remove pyro stains from nails and fingers, naturally foregoing the redevelopment after scrubbing the nails with the metabisulphite.

THE ICE MAN'S HARVEST

We do not remember having seen a photograph of this nature before. It is unusual and interesting as well. It also lends itself well to the photographer's purposes, which is not often the case when we try to make a story-telling picture in natural and unaltered surroundings. It is to be regretted that the crew of harvesters are not shown at their work instead of eying the camera with the air of "hurry up and get through" plainly evident. Data: Korona 5 x 7 camera; taken in Nebraska in January at 10: 30 A.M., bright light. Exposure, 1-25 second at *f*: 8 on a Seed 27 plate. Tray-developed with pyro; print on Azo C Hard.

TEMPERATURE

When a human being "has a temperature" folks put a thermometer in his mouth, and then telephone for the doctor. When said human being manages to give a plate a "temperature," he swears at the manufacturer of the plate because it becomes two things: a piece of glass, and a floating strip of film. This is not at all consistent, for the gelatine is more sensitive to changes in temperature than the man who uses it. A glance at the Thermo Development card shows that at a temperature of 64 degrees, tank-development requires 21 minutes, at 84 degrees — 12 minutes, and at 40 degrees — 49 minutes, to produce negatives of the same contrast. What can the man who pays no attention to temperature say to this? If he is wise, he will say nothing, especially to the manufacturer, although permissibly to himself, and will make tracks for the nearest

store where he can get a thermometer for taking the temperature of the solutions he uses. No good can come from guesswork, and to use a standard twenty-minute developing powder without considering the temperature factor is sheer folly and a waste of good material. By all means, do not at any time fail to observe the temperatures of the solutions you use and the effect that temperature has upon its action. Heat not only affects the rate of chemical action, but also its character in many cases; photographic processes are of a chemical nature, and very delicate, so that the factor of heat as indicated by the thermometer is one that no worker can afford to overlook.

THE SWING BACK OR SWING BED

At times, the swing back or bed is the means of making possible the photographing of a subject that could not be handled without it. To the photographer who asks if a camera equipped with this adjustment is worth the difference in price when compared with another equipment without the adjustment and costing a few dollars less, we have but one reply, "It is more than worth the difference." The commercial photographer finds the swing most useful when photographing tall buildings too high to be successfully handled with the help of the rising front. The swing is brought into play and the lens pointed up until the top of the building is included upon the plate. The plate is not inclined, but is kept perpendicular, parallel to the rise of the building so that there is no introduction of distortion. The tilting of the lens makes necessary the use of a small stop, as the focal plane of the lens is shifted to be at an angle with the plate. Another use to which the swing is placed is to avoid distortion when making portraits. Of all the points criticized in the work of our readers, none stands out so glaringly as that of violent foreshortening of arms and legs, or the shoulder in the case of a side view. The fault arises when the camera is placed close to the subject, and the different parts of his body, being proportionately at quite different distances from the lens, are not rendered in sizes proportionate to life. With the swing the camera may be raised, and the lens pointed down to make the distances of the different parts of the body relatively more equal. This same principle can be applied to landscape work to emphasize one side or another of the view or to equalize focus when the foreground is filled with objects that are very close to the lens. This introduces distortion, which is not a matter of prime importance in landscape work.

SPOTTING PRINTS

Pinholes in a negative may not make any appreciable difference in its printing quality as far as contact work is concerned, but an enlargement of several diameters may show up the defects in the most distressing fashion. The remedy is simple, and with a little practice the presence of the pinholes can be entirely concealed. They should be blocked up with opaque, applied as sparingly as possible, just a trifle on the end of a fine camel's-hair brush being enough to fill the hole. The brush should be filled very sparingly, and the opaque applied with a stippling motion. When the enlargement is made, the spots will be entirely white, and they may then be touched up with a dilute mixture of India ink and Payne's gray, and if the work is carefully done, unless the print is examined too critically, none will be the wiser. As enlargements are generally hung or framed to be viewed at a distance, the spots will not show.

STEREOSCOPIC PRINTS

Although the double expense and extra bother of making stereo prints limit their popularity, they nevertheless give a maximum of relief and roundness that makes their production worth while to some enthusiasts. To make them, no special apparatus is necessary, provided the subjects are selected properly. Two exposures made with the same camera, one immediately after the other, the camera being shifted sideways about 3½ inches at right angles to the optical axis, will give the same result as can be obtained with a specially constructed stereo camera. The subject must be chosen so that no movement will take place between exposures. To rig up a camera-holder that will make the shifting of the outfit between exposures is but the work of an evening. It should consist in the essentials of a small shelf or table that will fit the tripod head so that it can be clamped firmly. On this the camera should be placed and clamped firmly while the first picture is being taken. A wooden strip to use as a register,

SNOW SHADOWS E. H. WENDELL

so that the camera will point in exactly parallel directions when taking the pictures, should be fastened either to the right or left of the table, so that the camera can be shifted the required distance without measuring. The two exposures should be of the same length and made at the same aperture. Whether the pictures must be reversed after printing will depend on the direction of the shift and the way in which the film winds in the camera relative to the direction of the shift. The regular stereo size is about 3 x 3 inches, and the prints should be mounted so that their centers are about 3½ inches apart. The idea of stereo prints appeals to many people, but after buying a stereo camera they lose interest or find the expense greater than desirable. To such we recommend the trial of a makeshift device or a suitable stereo camera-holder that can be bought for a small amount, in order that the process may be given a thorough tryout before a special camera is bought.

SNOW SHADOWS

The enthusiast who goes forth into the crisp air of a winter's afternoon will find many opportunities to photograph just such scene as this. The sinking sun casts long shadows that divide and subdivide the snowy surface of a landscape into many parts. Therein is the secret of making a pleasing snow picture — *get those shadows.* And the secret of getting them is to give sufficient exposure. Mr. Wendell evidently

MORNING LIGHTS AND SHADOWS — E. A. JONES

gave sufficient exposure, but in enlarging produced a print with a trifle too much contrast. At the same time, the arrangement and the presence of the shadows give evidence of what may be made from rather meager material. Data: 3¼ x 4¼ Voightlander Alpine camera, Collinear lens, of 4¾ inches' focal length. Made in Colorado in January at 3:30 P.M., bright light, Standard Orthonon plate. Developed with Rytol in tank; enlargement on P.M.C. Bromide.

MORNING LIGHTS AND SHADOWS

In the April, 1916 number of *Popular Photography*, we reproduced a picture of this subject, but with the vista effect marred by a branch-filled foreground. Mr. Jones sends us this picture with the remark that our suggestion regarding viewpoint seems correct, and that although he followed our suggestion and made the exposure from a point further back than before, yet the camera might well have been placed still further back. The vista effect is much better than in the first picture, however, and the play of light and shade is suggestive of the early morning sunlight. Data: 3A Kodak, Zeiss Kodak anastigmat *f*: 6.3. Taken in California in January at 8:30 A.M., good light. Exposure (calculated by our "valuable Tables," as our friend calls them), 1 second at *f*: 16 on regular Ansco film. Tank-developed with pyro; print on Velox Special Portrait.

WATER

The most neglected chemical used in photography is water. Considering that it is the most used of any, such a statement may seem surprising. Practically all water contains impurities so that distilled water is ideal to use for photographic purposes. This not being available for most of us, the next best supply is drinking water boiled, cooled, and filtered, this being especially desirable for making up stock solutions. Boiling will remove many organic substances as well as some mineral traces present in hard water.

WHAT IS A SNAPSHOT?

The word snapshot is much abused by the "highbrows" of the photographic fraternity, so much so that it has become in some sense descriptive of a picture made by some reckless photo fiend whose main object in life is to snapshot right and left at anything within sight. It is almost always applied to pictures taken with a film camera, so that the

THE HARVESTER H. R. HAINES

First Prize, November Junior Competition

big army of amateurs come in for their share of the slight bestowed upon snapshots. What is a snapshot? Why not place the word on a sound basis and use it in a sense that will carry with it no suggestion of inferiority? True it is that the snapshot craze has been much overdone and that there are too many who snapshot everything around them in a hit-or-miss fashion. It is equally true that the bulk of spontaneous pictures of children and animals, press photographs of action subjects, and a host of other photographs of undisputed value are snapshots. Hence, whereas we must admit that snapshotting can be carried too far, we must give the word a decent meaning and define it so that it will not be used incorrectly. What is a snapshot? In the first place, let us define it from the standpoint of shutter speed. If the camera is held in the hand, the limit of exposure without blur is 1-10 to 1-25 second, depending on the individual and the focal length of the lens. We have made successful exposures of 1 second with an Atom camera held in the hand, but that is unusual. With cameras making pictures from 2¼ x 3¼ to 3¼ x 5½, the limits suggested above are approximate for nearly everyone. Any picture made with the camera held in

MOUNTAIN SHEEP M. V. BROWNING

the hand, with an exposure of 1-10 second or less, is a snapshot. What if the camera is placed on a tripod, focused, and then given an exposure of 1-10 second or less—is it a snapshot? We should not call it such, preferring to limit the meaning to the act of taking the picture under conditions requiring quick judgment, and a steady hand. Give the word this meaning, and snapshot will have the value they rightfully deserve.

DEVELOPER ACTION

A. E. P., Cleveland, Ohio, asks whether decreasing the amount of sodium carbonate in the developer will make any difference in the time of tank development. He also asks what dictates the proper amount of sodium sulphite necessary to prevent pyro stain, whether it is the pyro or the carbonate.—The rapidity of action of the developer is controlled by the amount of carbonate that is used. If the carbonate is reduced, the developer will act more slowly, and consequently the action must take place for a greater length of time in order to build up a negative to the contrast obtained with the regular formula in a lesser period. The amount of sulphite needed to prevent pyro stain depends upon the dilution of the developer as well as upon the amounts of pyro and carbonate. More concretely, the sulphite must be present in sufficient strength to prevent the oxidation product of the developer from depositing in the emulsion and causing stain. The more dilute the developer, the more rapid the oxidation; the more carbonate in relation to the developing agent, the more rapid the oxidation; hence the need of using more sulphite in a tank developer than in a tray developer, or of using a fixed quantity per ounce of developer, regardless of its strength, as recommended on our Thermo chart.

MOUNTAIN SHEEP

The winter of 1915 was so severe that many wild animals in the western mountain ranges were driven from their accustomed haunts downward to the foothills where their human brothers fed them. Of all the wary animals in the mountains, none are more so than the sheep, and it is therefore all the more unusual to find them herded in the villages, cropping the hay thrown out in quantity for their subsistence. Mr. Browning tells us that he did not make the negative, but that it was loaned by a friend so he might make a print for our readers. We are sure that the favor is appreciated. No data available.

COLD WEATHER PRINTS

On another page we have discussed the means of ascertaining the developing period of a paper, and made the statement that the careful worker will use a standard developer at the right temperature. In cold weather this is especially needful, for the temperature of the developer is likely to be far below normal, and most workers do not appreciate what effect this produces. Practically, what happens is this: The developer acts very

A CHILLY MORNING — WALTER J. COPPOCK

slowly because it is cold. A sheet of paper is exposed and placed in the developer. It "comes up" so slowly that the operator thinks he underexposed it, takes it from the tray, and throws it in the waste basket. Another print is exposed — the time doubled or trebled — and developed. It seems to be very hard and contrasty in the developer, and when it is removed and rinsed, it is found that the color is brownish-green and the shadows are blocked up, while detail in the extreme highlights is largely missing. The reason is that the print is really much overexposed, and its development is almost comparable to that of an overexposed print which is jerked out of a developer of normal temperature in which it is developing too fast. On the other hand, other workers who make it a point to note the correct exposure for a negative with a given printing medium (on the outside of the negative envelope) will give the right exposure and then remove it from the developer too soon, fearing that it will fog. In such case the print is weak and colorless. The moral is to keep the temperature of the developer up to the correct point, whatever the manufacturer recommends, and make use of the principle explained with regard to the developing period. This makes the printing process simple and automatic, and guarantees prints of good color that will not vary.

A CHILLY MORNING

A slightly different viewpoint would have completely altered the lines and the interest in this print. We reproduce it to illustrate what a great difference even a yard or two will make in the composition of a landscape view. First consider the impression this study makes. It is interesting. The eye goes first to the highlights at the right and follows through to the roof of the building where the highlight ends abruptly. There the eye stops for a fraction of a second. It then wanders back to the bend in the brook and finally meanders aimlessly out of the picture over the hill at the left. Didn't your eye follow this course? Placing the camera a few feet to the left and swinging the lens more to the right would have centered the interest better. The highlight would have fallen between the two trees in the foreground; the roof of the building would not have been split by a tree trunk; the space at the left would have been filled by the

THE LITTLE CRIPPLE — WM. D. KELLY

tree. The result would have been equally good balance and a concentration of interest, the eye being forced to one spot and not left to finally work its way out of the picture at the edge. Data: 5 x 7 Reflex, Rodenstock Eurynar lens of 9½ inches' focal length. Taken in Iowa in January at 10:00 A.M., bright light. Exposure, ½ second at *f*: 5.4 on a Roebuck D.C. Ortho plate, using a 3x ray filter. Tank-developed with pyro; print on Darko.

THE LITTLE CRIPPLE

This is a very good squirrel picture. Every detail is clear, and it gives an idea of the texture of the fur better than most studies which have come to our attention. It would have been better to have included the entire tail, which should have been easily possible with the Graflex. Also we would suggest that the title be changed. Squirrels have a habit of curling one paw in front of them as they stand studying a person approaching them, and we hardly think anyone would suspect that this squirrel is crippled. Possibly Mr. Kelly can also work a small catchlight into the eye, making it more lifelike. Data: 2¼ x 3¼ Graflex, Ic Tessar lens, of 4½ inches' focal length. Taken in New York in November at 3:00 P.M., good light. Exposure, 1-10 second at *f*: 4.5, against the sun, on Seeds Nonhalation L Ortho plate. Tank-developed with pyro; enlargement on Cyko Linen.

HOW TO VIGNETTE

A. R. L., Chicago, Ill., asks if the Beck Isostigmar is in the same class as the Zeiss or Goerz lenses. He also asks how the background was vignetted out of the portrait published in the April, 1916, number of *Popular Photography*, submitted by Mr. Estabrook.—In regard to the lens we must refer our reader to *Practical Photography No. 3*, "How to Choose and Use a Lens." This volume was written solely for the benefit of those who contemplate the purchase of a lens, and explains clearly the different types so that the reader can make a comparison that is to his advantage, and make an intelligent choice of a lens. Regarding the vignetted print, we cannot say just how Mr. Estabrook accomplished his purpose, as there are several ways of accomplishing an identical result. As the altered study was an enlargement, we should assume that the maker adopted the simplest method — that of interposing a suitable mask between the projecting lens in the enlarger and the paper. This mask, or vignetter, when used in this way, should be a piece of opaque paper or cardboard with an opening

SPARKLING WINTER — WARREN T. LAITY

in it shaped as the part of the image that is to be printed, and large enough to cut off the light clear to the edges of the paper, allowing the image to be projected only through the opening. Kept in motion throughout the exposure, the image will be softly blended into the background, although the knack of accomplishing this may be learned only after a few trials. This is explained in greater detail in *Practical Photography No. 5*, "How to Make Enlargements."

SPARKLING WINTER

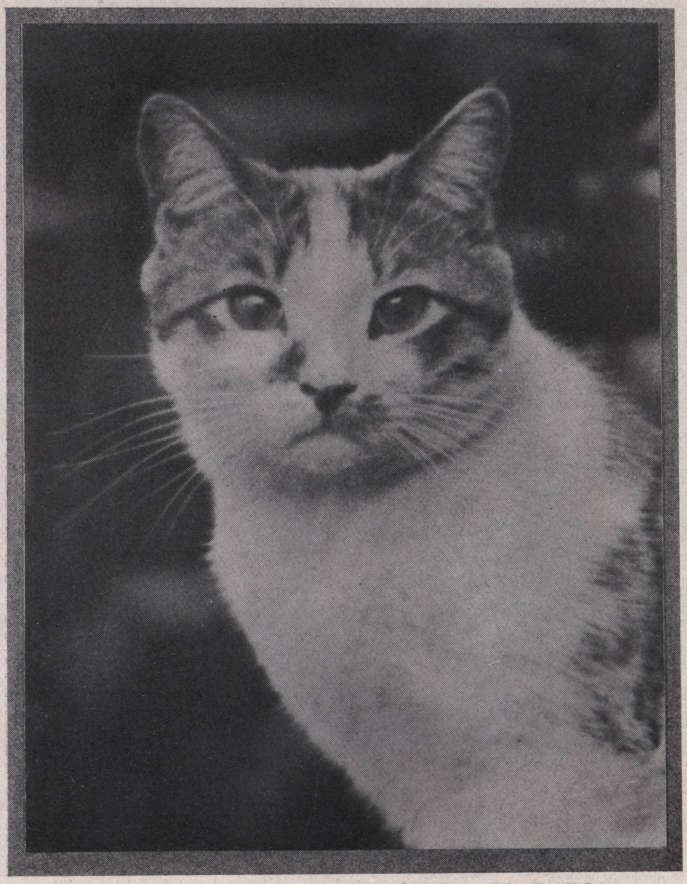
Winter is very much in evidence in this study, and Mr. Laity has certainly preserved the delicate halftones and shadow depths in a manner that shows he understands the problem of snow photography thoroughly. In the original print, the texture of the snow is well shown, although much of this quality is lost in the reproduction. Our only suggestion is that there is a bit too much in the view, and that by working over the enlargement with the old reliable L-shaped pieces of cardboard forming a hollow rectangle of changeable proportions, the maker will find an upright rectangle of lesser dimensions, which will please him more than the present arrangement. Data: 8 x 10 Century camera, Goerz Dagor lens of 8¼ inches' focal length. Made in New York in January, at 8:30 A.M., bright light. Exposure, ½ second at *f*: 16 on a Central Special plate. Developed with M.-Q.; print on Cyko Enlarging Plat.

TONING P.O.P.

H. H. K., Marshall, Iowa, asks for a formula and instructions for toning P.O.P. with gold chloride and sodium phosphate.—The simplest bath of this nature for gelatine papers is made up as follows:

Gold chloride	1 grain
Sodium phosphate	30 grains
Water, to	20 ounces

The deeply printed paper should be thoroughly washed until no milkiness can be detected in the water. It should then be placed in the toning bath and toned until there is little warmth in the shadows, as viewed *through* the print. One hour's washing after toning is necessary. Other formulas for a similar toner will probably be found by



TOMMY — MISS E. B. WOTKYNS

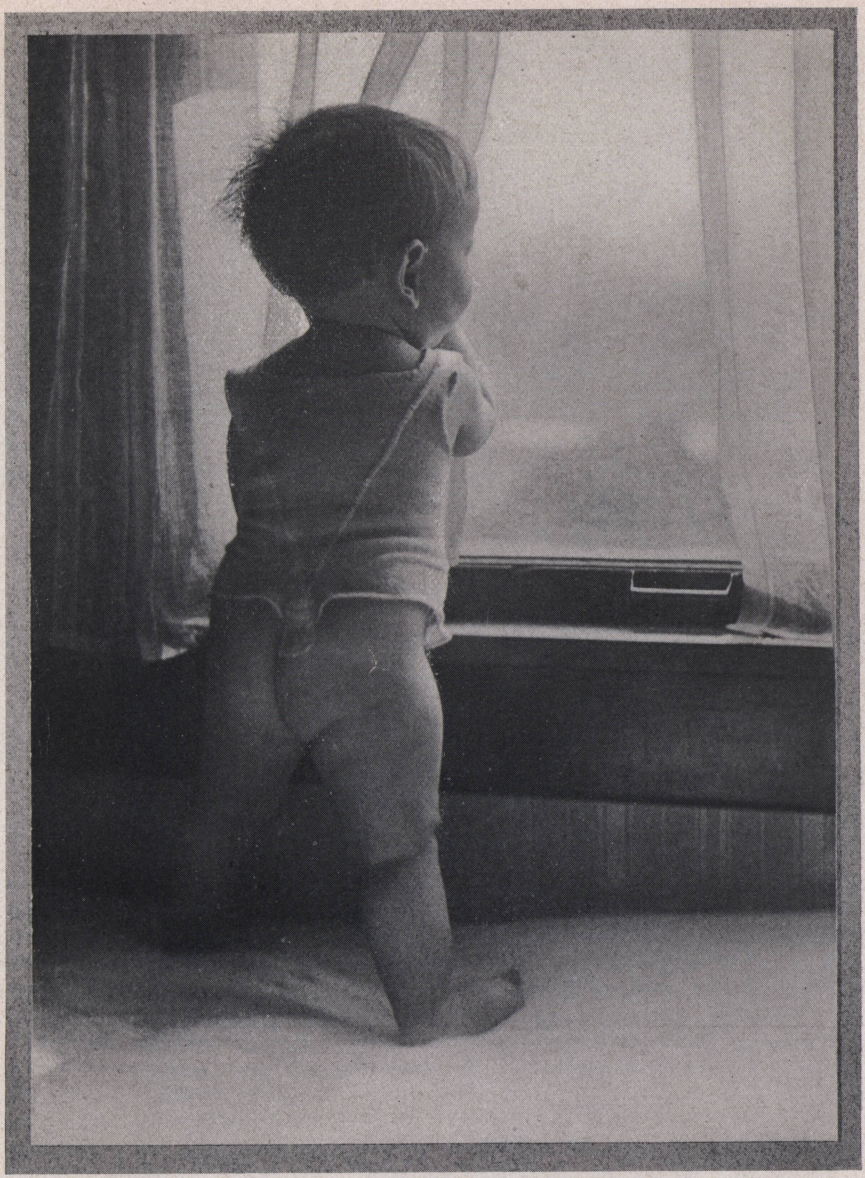
our friend, if he will consult the instruction sheet furnished with the paper, together with the best method of using it according to the manufacturer's tests. The best and most economical results obtainable can be had by following the instantaneous method described in *Practical Photography No. 4*, "How to Make Prints in Colors," which may be had from our publishers for twenty-five cents, if not procurable at your dealer's.

CONDENSATION OF MOISTURE ON LENSES

Moisture, unsuspected and undetected, is frequently the cause of underexposure, or an image diffused and flattened out by fog. Moisture will condense on a cold lens just as easily as on any other surface. In cold weather it must be watched for just as often as the camera is used. When setting the shutter or diaphragm, care must be taken not to breathe on the lens, and when dusting it off, no trace of moisture should come in contact with it. A lens kept in a cold room and brought out for portrait work indoors will invariably be coated with a film of moisture. It should be brought out in the room some time before it is to be used, opened up, and the dew wiped off occasionally until it ceases to appear. For outdoor work some people recommend a leather carrying case for the lens in winter weather, so that it can be carried in the pocket and so be warmer than the atmosphere. This is obviously impossible for the film-camera user, and from our standpoint entirely unnecessary, if the lens is watched so that any dew can be removed before exposing.

TOMMY

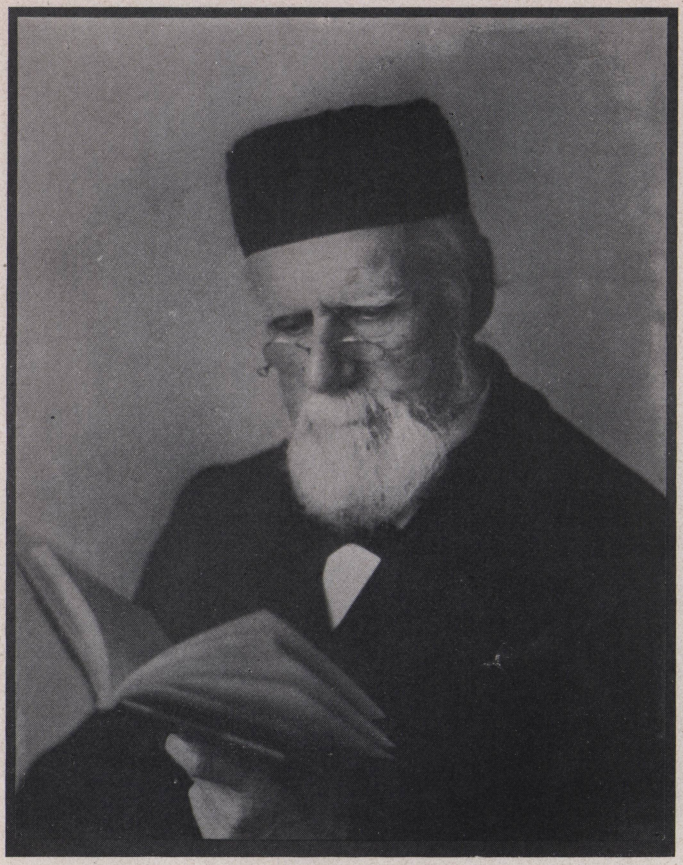
Cats and dogs — Miss Wotkyns surely has a knack of picturing them to advantage. Her subjects never appear ill at ease, frightened, or as if she cuffed them into



OH! LOOK! IRA T. BRONSON

Second Prize, November Junior Competition

submission. A little more detail in this study might be an improvement, but otherwise it is good. In regard to this point, it is possible that the detail can be produced in another print from the same negative, if the highlights are reduced. We find that many of our readers do not make a practice of treating the negatives at all after they have been developed, and in such case often miss just the one little detail of the process of making a good print which must not be omitted. Reduction and intensification are simple processes, easily mastered, and the only reason for so much procrastination with regard to them is that they are something like a swim in the early summer — it is the first plunge at which we hesitate. During these winter months a splendid opportunity is present to work over a few mediocre and unimportant negatives to gain an idea of three or four simple processes, especially of reduction. Data: No. 3 F.P.



MY FATHER — G. H. S. HARDING

Kodak, rapid rectilinear lens, of 5 inches' focal length. Made in California in August, bright sunlight, subject in shade of tree, at 11:30 A.M. Exposure, 1-25 second at *f*:8 on Eastman Speed Film. Developed with M.Q.; enlargement on P.M.C. Bromide.

FERROTYPE OR SQUEEGEE PLATES

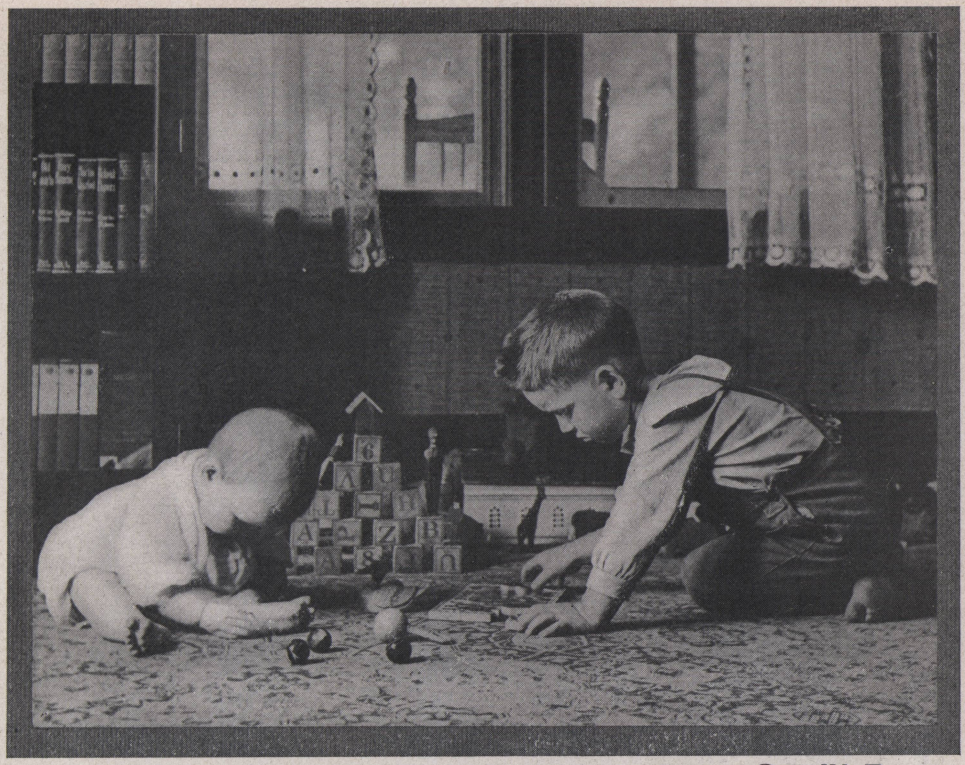
These are words of identical meaning, being thin enameled metal plates used to impart a high gloss to prints on glossy surface papers. The former is a term sometimes causing confusion, because of its similarity with "ferrotype dry plates," which are used in tintype and similar cameras, their basis being a thin sheet of iron coated with an emulsion.

MY FATHER

The treatment of this study is quite good, in the main. Mr. Harding has not made the mistake of entirely eliminating the wrinkles in the old man's features, but has subdued them sufficiently to rob them of the ugliness that often *seems* apparent when pictures of old folks are made, with the wrinkles predominating. In the subject, such wrinkles are to be expected; they tell a story, for it is generally possible to judge by an old man's features how he has lived. Consequently, they should be preserved, but care should be taken to govern the lighting so that the seams are not pictured as so many black lines. Full exposure and soft development bring the desired result. Data: 5 x 7 Century camera, Goerz lens of 9½ inches' focal length. Made in California, date not given, at 2:00 P.M., light from a north window. Exposure, 1 second at *f*:8, on a Cramer Banner X plate. Developed with pyrometol; enlarged on Cyko Plat.

IRIDESCENT STAINS

Chemical fog, taking the form of green stains at or near the edges of negatives, is



PLAYTIME — GEO. W. FRENCH

caused as a rule by the use of stale plates, decomposed sodium sulphite, or by forcing the plate in development especially when the developer has been previously used or is old. Unless other cause contributed to the stain, it may be removed by washing the plate well to completely soften the emulsion, after which it should be bleached in the following:

Ferric chloride	20 grains
Potassium bromide	40 grains
Water	2 ounces

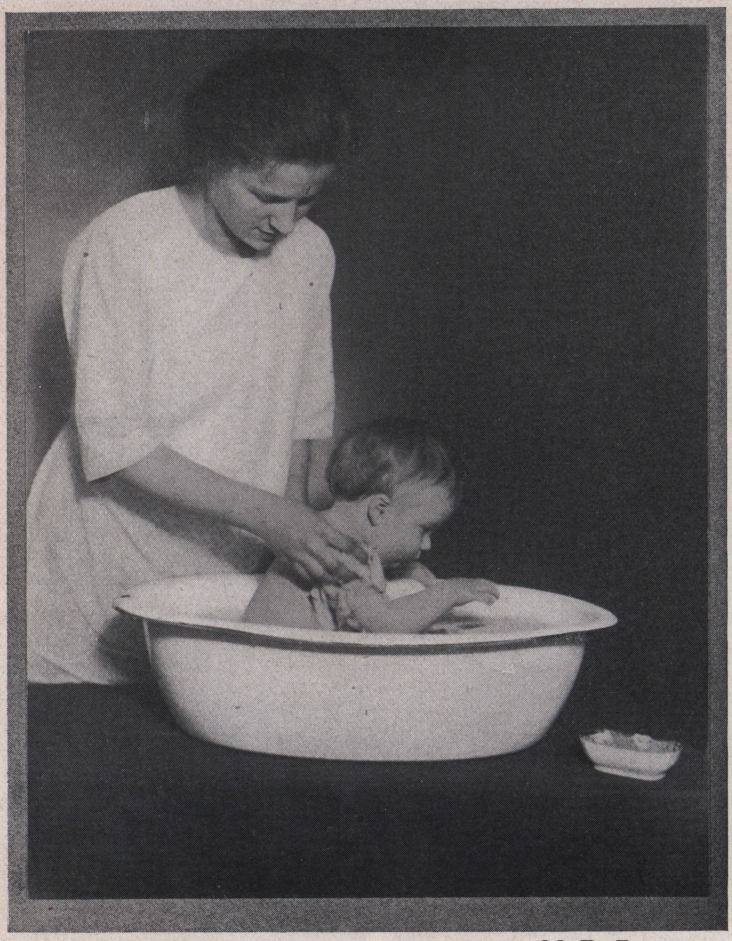
As the fog disappears, the plate will lose in density. It should be well washed after the color has disappeared and redeveloped in any ordinary developer to the required density, and then fixed and washed. This may be done in ordinary white light.

PLAYTIME

It is hard enough to make a good picture of one small youngster without the presence of a second to complicate matters. In making playtime pictures of a baby it has always been our practice to expose a batch of plates and trust to kind Providence that one or two of the dozen will yield a usable negative. If the elder of two youngsters can be coaxed into the game of "getting good pictures of 'brother,'" it is often a help. Without some such scheme of attack it is almost impossible to get good results. Mr. French does not say so, but we are willing to risk the opinion that the elder child in this interesting little playtime picture was his helper. Data: 5 x 7 Tel-Poco camera rapid rectilinear lens. Made in Massachusetts in July at 9:30 A.M., fair light. Exposure, quick bulb at U.S. 4 on a 4 x 5 Standard plate in a kit. Developed with pyro; print on Velox.

REDUCING PRINTS

As a general rule if a print is not a good one when developed and fixed, no chemical means can be called in to improve it. Prints that are too dark all over can sometimes be reduced, but the average case has demonstrated that it is simpler and saner to make a new print. Prints on silver P.O.P. may be somewhat reduced with Farmer's reducer, but continued action of the solution brings about a change in the appearance of the print, and as a rule spoils the color. Prints on gaslight or bromide paper may be re-



THE DAILY BATH H. B. RUDOLPH

duced in the same manner or with the persulphate reducer, but, as with the first-mentioned case, prolonged action will ruin the color. Neither solution should be used full strength, but rather diluted with about three times their bulk of water, so that the action will not be too vigorous and can be watched closely and controlled.

ICE FORMATIONS

It is a fine idea to have the camera loaded and handy for quick action at this time of the year. The proverbial "January thaw" brings with it a kaleidoscopic array of wintry effects — snow, sleet, ice storms, and a variety of unusual formations due to the rapid changes in temperature. Long tapering icicles hanging from the overhang of the roof, or from a ledge of rock not far from the house; peculiar crystalline formations on the windowpanes in the living room; a flurry of huge flakes on a day when the sun is shining brightly through a rift in the clouds, so that the storm can be pictured with even a rectilinear lens; these and other equally interesting things will be provided for us in the next few weeks. We have even seen some unusual pictures taken of an ordinary gutter on the side of a hill, where alternate thaw and freezing had made such a curious ice formation that the photographer had produced a print that looked for all the world like a miniature Niagara Falls in winter. Keep your eyes wide open and the camera ready for such effects — you will be repaid.

THE DAILY BATH

Here we are shown one of the events of the day. As far as we can judge, Baby is earnestly trying to find the toes on his right

foot. Possibly he has already had one hold on them, but, unlike the toe-hold of the modern wrestler, the grip was broken, and he is trying to get another. The point is that there is action in the picture. It would therefore be better if the title helped to strengthen that impression. Technically the pose and arrangement are quite good; the soap bowl at the right was introduced for balance, presumably, but really detracts from the strength of the triangular composition, as can be proved by covering the bowl with the thumb. We also believe that Mr. Rudolph will be more satisfied with his "mother and baby" pictures if the mother will wear a neutral-toned apron or dress. Not only is good rendition of drapery a difficult thing where the exposure must necessarily be short, but a baby is so small comparatively that the huge highlight of a mother's white or light-colored dress makes him seem much more insignificant than he really is. Data: Century 5 x 7 camera, Euryplan lens, of 7 inches' focal length. Taken indoors by flashlight, using a teaspoonful of Luxo flash powder; stop *f*: 4.8, Plastic plate. Tray-developed with hydro-metol. Enlargement on P.M.C. Bromide.

A HIGH SCHOOL GRADUATE — HENRY F. NIX

CLEANLINESS! ! ! ! ! A TRUE STORY

We have put all those exclamation points above, because we want you surely to read this paragraph. Cleanliness does not mean ordinary dirt when used in connection with photographic processes. It means *any foreign matter at all* that has succeeded in worming its way into trays, chemicals, or solutions. To illustrate: Not long ago we were called upon by a friend to locate the cause of blue spots on some sepia prints. They were evidently caused by iron, but where it could come from was a puzzle, as everything in the workroom was clean and shipshape. Where do you think we found it? On our friend's jackknife, and traces of it in a lumpy can of hypo that he had been viciously jabbing with the blade to powder it! And that was not all. This friend was at that time working on the hypo alum process, and every time he dissolved the silver nitrate, a fairly heavy white precipitate was thrown down. Distilled water and pure chemicals—where did the organic matter come from that caused the impurities? On a shelf our friend kept a supply of cut paper squares that were placed on the pans of the scales when weighing out chemicals; they had been there some time; they looked clean enough, but they were dusty. We proved it by carefully dusting one and making up a new unclouded batch of silver nitrate. What does this mean? It means that cleanliness is more than godliness photographically, and that the Editors are none to particular when they make such a fuss over a speck of dirt here and there.

A HIGH SCHOOL GRADUATE

The first detail of this study to be noticed by any of the ladies who read these pages will be the lacy sleeve that fills the point nearest the observer. Cover it with your finger and notice how much more effective the study becomes. Whereas a beautiful gown or hat is admittedly a big factor in setting off the charm in face and figure of a beautiful woman, it is imperative in a photograph

COAL GLEANER E. W. SHOEMAKER

that these factors do not overshadow the main point of interest — her face. This study is a case in point. It should have been lighted so that the eye instinctively sought the sitter's face, and stayed there. In the original print, the action does not stop, however, as one's eyes are drawn by the highlight on the shoulder, and because of the delicacy with which the lace has been portrayed, it is an object for inspection to the disadvantage of the portrait.

THE DARKROOM LAMP

The day of the suffocating, smelly darkroom is passing. The electric light has made this possible. And the best part of it is that the use of an electric light is not confined to those having electricity in their homes. The pocket flashlight offers a solution of the problem for those who have no current available. The ordinary pocket flashlight will burn for several hours on a stretch, and as it is required for only a few minutes at a time when burning in a darkroom lamp will last indefinitely, if used only for darkroom purposes. As a suggestion to those who would like an electric lamp of this nature, we recommend the following: Secure a small tungsten lamp such as is supplied with the bicycle headlights that require two dry cells (No. 6); secure the cells also. Take an ordinary tin can about six inches in diameter, and eight inches deep; a coffee can is what we have in mind. Take a piece of good quality ruby glass and have it cut to a circle just large enough to fit inside the can. Cut a 5½ inch circular opening in the top of the can. The glass should be laid within the cover, the quarter inch rebate preventing it from falling through. A lightproof joint can be made by pasting black paper around the edge of the glass and against the side of the cover. When the cover is placed on the can, it should be bound all around with a piece of electric tape, so that it will not slip off. In the bottom of the can, fasten a small lamp socket, that can be obtained with the lamp or at an electric supply store. Punch two holes through the bottom of the can, and run fine wires to the binding posts, insulating them where they pass through the can by winding a turn of tape around each. Another hole punched to attach a piece of twine to the can, and the darkroom light is completed by screwing the lamp in place and connecting to the cells. The lamp can be hung anywhere in the room wherever most convenient, and turned off and on by means of a homemade switch constructed of two strips of brass, or one can be purchased for a few cents. Two dry cells will last a season of average use on a bicycle, and should give an equally long service when used in the darkroom. When summer comes and the smelly darkroom lamp becomes an abomination, try this plan, and you will never use an oil lamp again.

COAL GLEANER

This picture is interesting because it brings to us an idea of the life and work-day dress of many women in the mining districts. In spite of its interest it has some bad points, all of which could have been avoided. One foot is missing; the face is seamed and wrinkled too harshly, and the eyes squint; the background is too heavy and conflicting. The first defect is common and avoidable if the operator will remember that his eye is at one level and the camera lens at another; consequently any objects between the lens and the main point of interest must be carefully viewed in the finder to make sure they do not obstruct a clear view to the latter. In this case shifting the camera

THROUGH THE PINES OF TAHOE — MISS D. DOBBINS

would have made both of the lady's feet apparent. The background and squint would disappear if the picture had been taken so that the sun did not shine directly into her face; this, too, would have softened the wrinkles, although some should remain to lend character to the face, which is one of the requisite points when depicting "types." Data: No. 3 Kodak, R.R. lens of 5 inches' focal length. Taken in Pennsylvania in March at 2.30 P.M., bright light. Exposure, 1-25 second at *f*: 11 on N.C. film. Tank developed with pyro; print on Cyko.

THROUGH THE PINES OF TAHOE

There is material in this view for a fine piece of pictorial work. The patchy sunlight effect, the sentinel-like trees, and the cobble fringed path suggest the possibilities

DAFFODILS W. M. WHITE

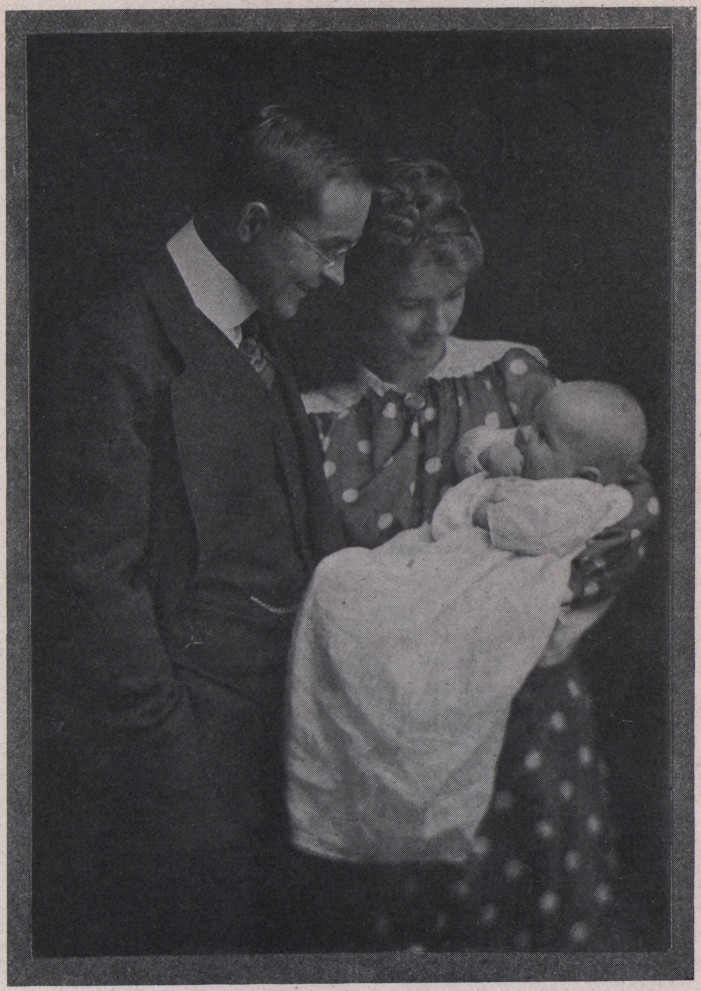
of a vertical panel. As it stands the picture is interesting, although we think it could be improved. As you glance at it the eye involuntarily stops in the bright patch of sunlight in the foreground; starting up the path your gaze encounters the break in the trees at the right and you follow it through. It should follow the path into the distance; it is the path with its patches of light and shadow, and its sentinel trees that attract the photographer's eye and which, instinctively at least, he wants to image on his picture. It follows, then, that to lead the eye into the distance down the path the highlights in the foreground and the right side must be eliminated or subdued. Several means can be employed. Moving the camera forward will avoid both, but will cut down the effect of the height of the trees. Using a lens of long focal length at a greater distance so as to lessen the angle of view would accomplish the same thing and would show the trees to better advantage. Data: 2¼ x 3¼ Eastman camera. Taken in California in September at noontime, bright light. Exposure 1-25 second at *f*:16 on N.C. film.

PLATE KITS

In looking over the data supplied with competition pictures, we notice that it is quite rarely that plates are used in kits. We are rather surprised at this, because it is usually true that only a small part of a negative is worth printing, the extra surface representing just so much waste. Did any of our readers who use cameras of postcard size or larger ever consider this? It is true that for pictorial work a long-focus lens is much to be preferred; the use of a small plate in a kit amounts to much the same thing if an enlargement is to be made, since it represents an increase in the ratio of the focal length of the lens to the diameter of the plate. Our most used outfit is a 3¼ x 4¼ double-extension, film-or-plate camera, and when we are out in the woods or the fields, we use a single combination of the lens, having a focal length of 8¼ inches, This we find none too long, and we feel sure that many who are using 5 x 7 and 6½ x 8½ cameras would not only be greatly pleased with the reduction that small plates will bring about in expenses, but would also find that the use of a smaller plate will give them studies in which the perspective is much better than they have hitherto secured, and that, even so, at times they will deem it necessary to cut off part of the small negative when enlarging for pictorial effect.

DAFFODILS

It is rather interesting to note the personal preferences of our regular contributors, both as to subjects and methods of work. It is often possible for the judges to look over a batch of prints laid out for their inspection, and to select a few of which they can say without looking at the data slip, "That is So-and-So's work." Mr. White is evidently a lover of flowers, judging from the number of studies sent us. This particular one is



BABY — FRED E. CRUM

much better in the original than in the half-tone reproduction, principally because the print is of a sepia hue that is not nearly as contrasty as the black and white effect of the printed page. Our sole suggestion is that there is somewhat too much weight to the vase because it is of a lighter tone than the flowers, which it seems to us should have the lighter hue to give them predominance.

BABY

As a rule, pictures of "our baby" show him at play or with his mother; generally the gentleman who is at least interested enough to pay the bills does not shine before the public — pictorially, at least. In this pretty little group the young "Dad" is about the most interested and awe-struck of the three, judging from the expression on his face. This is one of the best-caught family groups we have seen in some time, owing its interest to the spontaneity of pose and expression of all three members. There is not a detail out of place — not even the baby's thumb. For the benefit of those who comprise a family of three, so that it might seem that one member must operate the camera, a device such as the Wait-A-Minute, recently marketed, will prove a boon when making outdoor snapshots in which the psychological moment — or rather, instant — of Baby's complete inertia is not a matter of utmost importance for the sake of avoiding motion. Data: 8 x 10 Studio camera, portrait lens of 15 inches' focal length. Made in New York in June at 11:00 A.M., good light. Exposure,

RUTH — WALTER RUTHERFORD

1/4 second with lens wide open, on a Plastic plate. Developed with pyro; print on Noko Buff.

RUTH

Doubtless this young lady will be recognized as one of the sisters in Mr. Rutherford's prize-winning picture entered in the November competition; this print was an honorable-mention winner in our September competition. Comparison with "The Sisters" is worth while, as it gives an opportunity for those interested in home portraiture to observe how the same subject may be handled to advantage in more than one pose. To our mind the head in this study is thrust forward somewhat too much, but this effect can be altered by trimming the print at a different angle. Data: Studio camera, Verito lens of 18 inches' focal length. Made in Toronto, Canada in May, bright light. Exposure, 1 second at *f*: 5.6 on a Wellington Anti-Screen plate. Developed with pyro-acetone; print on Azo B Soft.

FLASHLIGHT FUSES

When children are present, the use of a flashlight gun or any device that is operated by a trigger arrangement is avoided by many people who enjoy the use of flash powder for making group pictures at home. To ignite the powder with a match fastened on the end of a long stick makes it necessary to omit one person from the group, but a slow-burning fuse will solve the difficulty. Very satisfactory fuses can be made at home. Their length should be measured, and the time required to burn a unit length ascertained, so that a fuse can be cut to

allow sufficient time regardless of the subject being photographed. To make the fuses, mix a concentrated solution of saltpeter in water, and soak blotting paper, crepe paper, or tissue paper with considerable fibre in it, until saturated. When dry, cut in narrow strips and burn two or three of measured lengths to ascertain the rate an average inch is consumed. The cutting of strips to burn any desired time is then simple arithmetic. To use, the flash powder is piled over one end of the fuse and the other end ignited with a match. Care must be taken to leave no loose grains of powder on the end of the fuse where ignited, as the whole charge might flare up in the photographer's eyes.

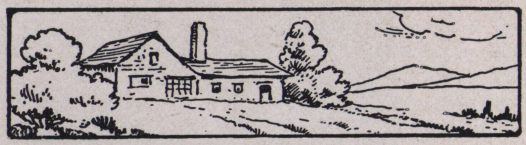
RAY FILTER

Probably one out of ten amateurs of two years' experience owns or uses a ray filter. Why, is hard to say, as its use entails no hardship, skill, inconvenience, nor, beyond the small amount spent for the filter, any additional expense. Every owner of a film camera who makes a habit of carrying it with him on week-end rambles is losing half — no, more than half — its efficiency in case he makes no use of a light ray filter. Every flower that is photographed by the wayside, every landscape that is snapped on a day when there are clouds in the sky, every marine that is pictured with the waves and spray flying can be improved by the use of a rayfilter. Neglect this important little accessory no longer, and while you are about it, buy two: one for use on subjects that require subduing of the parts above the horizon only, the other for general correction of the color values. Users of plate cameras are not making the most of their opportunities if the ray filter is not a part of the equipment; the plate camera has one big advantage in the matter of emulsions: it can be loaded with a plate for every purpose. As frequently that purpose involves the use of an orthochromatic plate, the filter and a supply of orthochromatic plates is really a necessity.

POST MORTEM PHOTOGRAPHS

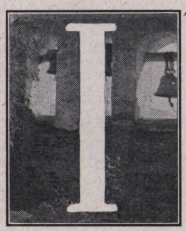
Without wishing to introduce anything funereal into these pages, we venture to say a word or two on the subject of post mortem photographs. At some time or other a demand for such a picture may arise, and it is best to know how to handle it. Full face portraits are seldom satisfactory, and are difficult to secure, especially if the deceased has been placed in the casket. The best method is to set up the camera for a profile photograph, placing it level or only slightly higher than the subject's head. The background should be dark, and thrown out of focus as much as possible. A strip of velvet or plush, placed over the further side of the casket, so as to make the background one even color, will serve well. A profusion of flowers should be avoided, as simplicity is needed to give the subject a suggestion of dignity and reverence that should mark our attitude toward one who has finished his part in our lives. The profile should be lighted fully, and exposure must be calculated to care for the dark color — black, mahogany, or walnut especially — that is used in the finish of the casket. Full exposure, soft development, and printing for soft effects on a matte- or plat-finished paper are desirable; a dark mount is advisable.

ALONG THE SANDY LICK — CHAS. S. LORD



EDITORIAL

OUR COMPETITIONS



IT is not an easy matter to make a satisfactory portrait of two people, one which is well lighted and well posed. Considering this, we have awarded Walter Rutherford first prize in our November Senior competition for his study of "The Sisters," reproduced on page 17. This is spontaneous, and the flesh values are very good in the original print — better than the reproduction suggests. Data: 4¾ x 6½ studio camera, with Verito diffused focus lens of 18 inches' focal length. Made in Toronto, Canada, in May, bright sun outside. Exposure, 3 seconds at *f*: 11 on a Wellington Anti-Screen plate. Developed with pyro acetone; print on Paget Bromide, Rough. Second honors were won by Mrs. Margaret Anderson, whose consistent efforts have been coming to us regularly. The prize study is "The First Snowfall," reproduced on page 15. A close scrutiny of the view shows that it is truly an early snowfall, and yet one cannot but be surprised to note the date it was made. The atmosphere depicted is excellent, suggesting early morning or late afternoon, soon after the snow had ceased falling, the sun just beginning to break its way through the clouds. Data: 5 x 7 Conley camera, *f*: 4.5 anastigmat lens. Made in Nebraska on October 17 at 10:30 A.M., good sunlight. Exposure, 1-25 second at *f*: 6.8 on a Seed 27 plate. Developed with edinol; print on Azo Grade D Hard. "The End of the Day," by Warren R. Laity, took third place, and is shown on page 35. Mr. Laity has not made the very common mistake of losing all detail in the landscape portion of this view, as is done by the majority of workers in an attempt to produce a "fake" moonlight effect. Data: 5 x 7 hand camera, Goerz Dagor lens of 8¼ inches' focal length. Made in Casco Bay, Maine, in September at 5:00 P.M., weak sunlight. Exposure, about 1-30 second at *f*: 6.8 on a Standard plate. Developed with M.Q.; print on Enlarging Cyko, redeveloped.

In addition, the judges selected prints for Honorable Mention and Commendation as follows:

Honorable Mention: "A Bird in the Hand," Ernest Barker; "The Tower," Carlos F. de Moya; "Kissed by the Morning Sun," Jared Gardner; "The Stoker," J. Kreig; "Wistful," Wilma B. McDevitt; "Study," Sam Ninomiya; "The Hut in the Woodland," Wm. Westman; "The Spinning Top," W. M. White.

Commendation: "Autumn," L. Armitage; "The Woodland Brook," Mrs. M. Anderson; "Sunlight on the Columns," Lawrence Baker; "The Beginning of a Happy Day," M. V. Browning; "Come, Mama Duck," Grace L. Cheney; "Look Around!" R. L. Cline; "Cala Lilies," Geo. G. Cousins; "A Child's Head," Fred E. Crum; "The Little Student," Geo. W. French; "A Scene in Colorado," Gustav Glueckert; "Behind the Bars," Geo. H. Heydenreich; "The Old Mill," Margaret Hitchcock; "Where the Moss Hangs Heavy,"

Mrs. L. L. Holford; "An Autumn Scene," W. Kempin; "U. S. S. Louisiana," Geo Miller; "Where the Summer Days are O'er," F. A. Northrup; "Beaver River," Harry G. Phister; "Two Old Timers," H. B. Rudolph; "Tecumseh Trail," Ross Skinner; "Threshing Series," J. A. Wilson.

The Junior competition brought out some high-class efforts this month, and the task of the judges was quite extensive in eliminating the prints of lesser value. Because of its evident truth of background and arrangement, as well as its technical production, "The Harvester," by H. H. Haines, reproduced on page 41, was awarded first prize. It is the best harvest picture entered so far in the Junior class. Data: 4 x 5 Seneca camera, Vinco lens of 6¾ inches' focal length. Made in New Jersey in September at 4:00 P.M., hazy sun. Exposure, 1-25 second at *f*: 6.3 on Premo film pack. Developed with pyro-soda, tray method; enlarged on Eastman Rough Bromide. "Oh! Look!" by Ira T. Bronson, the second prize in this class, page 47, needs no comment. To anyone who has a youngster, or lives in a family where a youngster rules supreme, this happy little pose tells a story plainly. Data: 4 x 5 Graflex, Plastigmat lens of 6¼ inches' focal length. Made in Missouri in November, at 11:30 A.M. Exposure, 1-10 second at *f*: 6.8 on a Graflex plate. Tank-developed with pyro-soda; enlarged on Buff Artura Carbon Black.

Selection of Honorable Mention and Commendation prints were made as follows:

Honorable Mention: "The Willows," D. A. Atkinson; "Grinnell Falls," C. K. Baker; "A Tree Study," C. E. Fey; "Alley Rats," Ira W. Guldner; "Kentucky Harvest," J. Peitzmeyer; "Afternoon Sunlight," Jas. J. Ryan; "The Lane," D. A. Waugh.

Commendation: "Outdoor Portrait," W. G. Adams; "Watchful Waiting," Jas. Allan; "Where the Note of the Hermit Thrush is Heard," C. D. Appleby; "Drive and Barn," Ross W. Baker; "Cleveland Art Museum," Geo. O. Behrend; "Among the Flowers," Mary Benham; "The Pillars of Hercules," Ernest L. Benson; "The Gym Floor," Willard H. Bonner; "Happy, Have a Peanut," Jacob Bosshart; "Goat Island Bridge," Thos. B. Brown; "Waiting for the Doctor," Edwin O. Catford; "Gay Lights of the Night," P. A. Cazaubon; "A Pacific Sunset," E. W. Cochems; "Our Flag," E. Waldo Compton; "Greek Maidens," Nina Coughlan; "The Lagoon," J. Louis Cunningham; "Among the Hills of Virginia," S. M. Dobbs; "Niantic River," Frederick S. Eaton; "Jack-in-the-Pulpit," A. T. Flikke; "Bob," Robert L. Forbush; "Reverie," O. H. Fuller; "Mission Concepcion," W. H. Hall; "Childhood Days," Fred Harris; "Main St.," Norman C. Harris; "Opus," R. C. Heagey; "Looking for Business," Pollux Hein; "The Capitol Colonnade," M. Arnold Herlin; "Contemplating a Visite," F. W. Hill; "High Water," Ruth M. Howell; "Portrait," O. B. Humphrey; "Watkins Glen," J. P. Hutchings; "Child Study," W. Kitchen; "Stepping-Stones," Irving S. Lovegrove; "Writing a Letter to Santa Claus," Ralph S. Miller; "The Road to Yesterday," Mary E. McEntee; "Abandoned," Hubert C. Mohr; "Nectar Gatherer," Louis R. Murray; "In Merry Play," Juventino Ocampo; "The Old Mill," Henry L. Osborn; "A Bit of Scenery," Albert Richards; "Rainbow Falls," John Selden; "Winter along the River," M. C. Still; "The Little Tripple Falls," F. F. Patterson; "Gone back to the City," C. A. Pierce; "The Approaching Storm," J. G. Pratt; "Edward," Mrs. L. P. Van Woert; "The Spider and Web," John Wilkins; "The Dreamer," Herman D. Warren; "Feeding the Pigeons," W. E. Wotkyns.

INDEX FOR VOLUME X

Following our custom we have compiled a comprehensive index of Volume X of AMERICAN PHOTOGRAPHY, which will be supplied to readers without charge upon request.

ROLL OF HONOR

As an incentive to consistent work by our readers, the Roll of Honor is published every month. Five awards entitle the winner to one star on the roll. Winning an award of lesser degree than that for which the star is given, does not apply toward securing a second star.

ROLL OF HONOR

Commendation, Senior Class

M. V. Browning* Richard Pertuch*
Fred E. Crum* H. B. Rudolph*

Commendation, Junior Class

Miss E. B. Wotkyns*

MARKET PLACE

Farm and Home, Phelps Publishing Company, Springfield, Mass., needs photographs of agricultural and household subjects. The size is not of great importance if they will reproduce well. Preference is stated for 4 x 5 or larger prints, mounted or unmounted. Prices vary with the size of the picture and value of the subject, the minimum being 50c for 4 x 5, 75c for 5 x 7, $1.00 for 6½ x 8½. For copyright prints prices are a matter of correspondence. Rejected prints returned if accompanied by necessary postage.

Thompson Art Company, Portland, Maine, pays $1.00 and upward for negatives of nature subjects, without figures. Prints should be sent first as proofs. 8 x 10 is the preferred size. Prints will be returned to the maker. For copyright prints the price of the copyright will be added.

Farm and Fireside, Springfield, Ohio, uses pictures of garden, live stock, dairy, crops and soils, orchard, and poultry subjects. The smallest size available is 4 x 5, preferred size being 5 x 7, either mounted or unmounted. The price paid varies.

The Edgell Company, 13th and Hamilton Streets, Philadelphia, Pa., needs pictures for calendar subjects, juvenile studies, children and ponies, child and dog studies, good looking girl with a horse, and humorous studies. No plain landscapes wanted. The size preferred is 8 x 10 and larger. Payment varies according to the value of the subject.

P. Benson Oakley, Box 64, Norwich, N.Y., needs photos of news interest, live news of interesting events only. The smallest available size is 3¼ x 5½, that and 5 x 7 being preferred sizes, unmounted. Prints will be returned if postage is sent for that purpose. Payment varies with the value of the photo. Copyright photographs are not wanted.

Harry F. Blanchard, S. Glens Falls, N.Y., needs negatives of foreign people in natural habits, and places of interest. Prints should be sent for examination. The smallest available size is 4 x 5, size preferred being 5 x 7; prints will be returned if postage is sent for that purpose. Prices vary from 50c up to $5.00.

SHOP NOTES

AUTOMATIC PLATE WASHER

Plate-washing devices of various sorts have been described from time to time in our pages, but the novel design here presented is something entirely new in the way of a wash box. It will thoroughly wash plates in twenty minutes, and is so constructed that there is an underflow as well as an overflow of water, thus preventing the gathering of hypo, at the bottom of the box.

Figure 1 shows the complete device. It consists of a wooden tank, deep enough to fully immerse the plates. Above the box, centered nearly above one of the longer edges, is a V-shaped trough, which is not closed but left open 1-16 inch along the entire length. Water flows into this from the faucet, and because of the narrowness of the opening spreads so that there is a flow of water into the tank from the entire length of the trough. This provides an

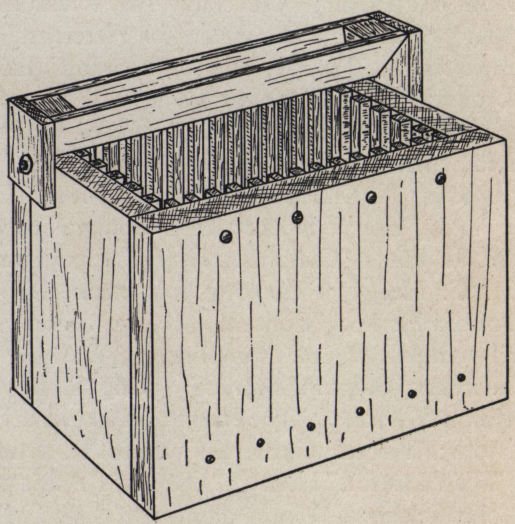


Figure 1

even flow of water that will strike every plate in the box. The underflow is provided by six ⅛ inch holes just above the bottom of the box, which will allow only a portion of the water to flow out. The rest of the excess water flows out of four ¼ inch holes bored through one wall of the tank ¼ inch below the top. All outlet holes are on the opposite side of the tank from the trough, ensuring a direct flow across the surface of the plates. The trough is

pivoted so that the full width of the box can be utilized for the plates.

The construction of the box is quite simple if planned in advance, and the grooving of the sides is accomplished as later explained. The model is designed to accommodate either 4 x 5 or 5 x 7 plates, and dimensions are given for those sizes. However, if it is desired to have the box accommodate any other two sizes, the inside length of the box should be ¼ inch greater than the length of one plate, while the inside width should be ¼ inch greater than the length of the other.

The bottom and side pieces of the box should first be cut; they are made of 1 inch stock. The bottom piece is 5¼ x 7¼ inches. The larger side pieces are 7 x 9¼ inches. The smaller side pieces are 7 x 5¼ inches. A supply of strips of ¼ inch square stock must also be procured or cut, each strip at least 14 inches long. These are fastened on the inside of the side pieces, forming slots into which the plates are dropped. In order that the strips may be exactly aligned when the side pieces are in position, the opposite side pieces should be placed bottom edge to bottom edge as shown in Figure 2, and the strips laid completely across them. Then when cut apart, as along the dotted lines *aa*, and stood on edge, the strips will be exactly aligned. The dotted lines are 1¼ inches from the edges of the side pieces in contact. The cut should be made 1¼ inches so as to allow a clearance of ¼ inch when the bottom piece (1 inch stock) is fitted between the side pieces. The strips should be placed on both sets of side pieces, starting 1 inch from the ends of the longer pair, and ½ inch from the edges of the smaller pair. The pair shown in Figure 2 is the longer of the two.

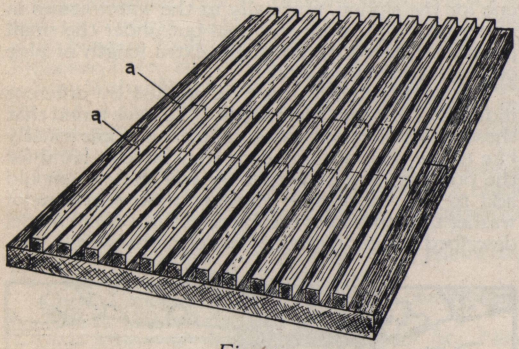


Figure 2

Before putting the walls together give them a thorough coating with asphalt enamel, especially along the corners and edges, so that when assembled any water getting into the cracks will not cause the walls to warp.

Assemble the box with the walls overlapping the bottom, and with the ends of the longer side pieces overlapping the other two. *Screws should be used, not nails.* Just above the bottom of the tank, drill six evenly spaced ⅛ inch holes, as shown in Figure 1, on one of the long sides. On the same side-piece drill four ¼ inch holes, evenly spaced along the upper edge of the wall, and ¼ inch from the top. In other words, center these holes ⅜ inch from the top. Use a straight-sided drill for these if possible, making a clean hole. Work asphalt enamel through the holes so that they will not swell when water flows through them.

The trough is simply constructed. Two side pieces of ¼ inch stock, 2 inches wide and a shade more than 9¼ inches long are bradded over two wedge-shaped pieces of 1 inch stock. The inverted apex of the trough should not be closed, but left open 1-16 inch. Two pieces of ¼ inch stock are fastened over the ends and down over the sides of the box and pivoted as shown, by running a flat-headed screw through a washer on the outside of the end pieces, as Figure 1 shows. These screws should be fastened fairly tight so that the trough will not overturn when full of water.

Give the whole device another coat, or two, of asphalt enamel and it is ready for use. In operation load the plates into the box, revolving the trough out of the way while doing so, and then place the device under the faucet with the water flowing into the trough rapidly. When it begins to overflow, adjust the faucet so that water is flowing gently out of the ¼ inch holes at the top, and leave the plates to wash for at least twenty minutes.

WASH BOX FOR ENLARGEMENTS

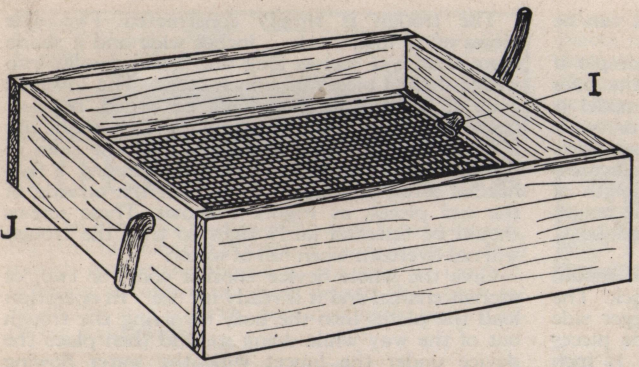
The problem of suitably washing prints and enlargements is one to which insufficient thought is given, presumably because the bad effects of insufficient washing are not visible until a long time after. It is a simple matter to wash small prints in a tray, turning them over every moment or two so that the water can run over them continually without their matting together. However, it is an entirely different matter to thoroughly wash a number of enlargements. In addition, the making of a number of enlargements in itself requires some time, so that the worker who takes an evening to make enlargements is likely to crawl into bed sometime in the wee small hours of the morning, if he does his work thoroughly and makes up a goodly batch of pictures.

For that reason some kind of an automatic washing device is a great time saver and will not only ensure prints that are permanent — provided the other steps in their making are correct — but will also allow the worker to devote his time to the making of the prints rather than to fussing with hand washing of them.

On the theory that prints from 6½ x 8½ to 8 x 10 are the more common stock sizes selected for enlargements, we offer plans for an automatic washing device to readers who are able to make use of running water. This will accommodate all the prints that any amateur worker is likely to make in an evening.

First construct of 1-inch stock a box — without a top — as shown in the drawing. This should be 16 x 20 x 6 inches, measurement inside. In putting it together use screws, and all edges should be planed square, so that when complete there will be very little chance of water leaking through even without caulking. White lead or paraffin, worked into the cracks before painting the box with two coats of asphalt enamel, will make the washer sufficiently water tight, as it will be placed in the sink where a few drops leaking through the cracks will make little difference.

At one end of the box — *1*, drill a 1-inch hole, 2½ inches from the bottom of the box and 3 inches from the corner. Secure a short section of lead pipe — ¾-inch will do — and flatten one end so that water passing out of it will spread like the flame of a fish-tail gas burner — see *1*. Bore a ¾-inch hole in a large cork and trim it down so that when the section



Automatic Wash Box

Suitable for either Enlargements or Small Prints

of pipe is pushed into it and the cork is forced into the hole in the box at *I*, it will fit snugly and not leak. A small wire nail or two driven at an angle through the side of the box will hold the pipe in place firmly.

In the opposite side of the box as at *J*, drill another hole, this being just 1 inch in diameter (or the same size as the pipe which is used as explained.) This is the drain; it works on the principle of a siphon, and must be carefully constructed. The hole should be placed about 1 inch below the top of the box, and 3 inches from the corner. A section of 1-inch lead pipe should be run through the hole and bent down to within ¼ inch from the bottom of the box. On the outside it should be bent over so that it will reach to within a quarter of an inch of the bottom. As the bottom is made of 1 inch stock, the pipe will extend one inch lower on the outside end than it can on the inside. This is imperative, as otherwise the siphon will not be formed when the level of the water rises above the top of the pipe and the water starts to flow out.

It will be seen that when the inlet pipe at *I* is connected with the faucet, water will be carried into the box and the level will rise until it can overflow through the loop of the pipe at *J*. Soon after it begins to flow over the loop, the siphon is formed and water will continue to flow until the box has been emptied to within ¼ inch of the bottom. The siphon will then be broken, and the box will again fill up to the level of the loop, when the same action will again automatically take place.

So that the prints will not be broken by the rush of water in and out of the box, a false bottom should be fitted to the box, on which the prints will rest when the level of the water becomes lower than the level of the false bottom. In order that the flow of water will not be confined to the edges of the false bottom, this should be a frame work of rather closely woven screening wire, about ½ inch mesh, and it must fit the sides of the wash box snugly so that no print can slip in between the sides of the box and the false bottom. To make it, fasten strips of 1 inch stock around the inside of the box so that their upper surfaces will be 1 inch above the bottom. Cut heavy screen wire to the inside dimensions of the box, allowing a small cutout for the siphon pipe, and lay it over the supporting strips. Over the edges of the wire fasten other strips of ½ inch stock, nailing them down. This will hold the wire in place and prevent the sharp edges from tearing the enlargements as they float around in the water. The wire bottom should be given a double coating of asphalt enamel, all surfaces exposed to the water thus being made impervious to warping or rust.

In action, the flat spread pipe will throw the water in a wide jet that will spread the prints and keep them separate for a time. When the siphon empties the box, the prints will lie flat on the false bottom until the water rises to their level; then they will float off one by one again until the water is lowered, when they will again mat down together but in a different arrangement than at first. The arrangement changes every few minutes so that at the end of an hour's time the prints are thoroughly washed. The process being entirely automatic, new prints can be dropped into the wash box as fast as they are fixed, and the hypo thus acquired will immediately go to the bottom of the washer and pass out through the siphon.

In selecting the pipes for the intake and siphon, remember that the water must pass out of the washer faster than it goes in, and as a result it will not do to use a large pipe for the intake and a small one for the siphon, especially as the water comes in under heavy pressure and goes out under the small pressure induced by the slight extra length of pipe on the outside of the siphon.

The same principle may be applied by different individuals to meet their needs. We have found that those who make their own equipment at home usually like to use the odds and ends they have at hand for the purpose, and consequently feel that we should add to this description the fact that any form of washer that embodies the main features of the model described will probably be entirely satisfactory.

ROUND WORLD EXCHANGE CLUB

The All-American album which was projected by this club will be placed in the hands of Mr. J. W. Jeffers, Attorney, Frankfort, Ky., for circulation, and we are also requesting this member to handle any plans for a continuance of the Club among members, if there is sufficient interest and demand for it. State Secretaries are asked to write Mr. Jeffers any plans which they have had in mind, before the end of this month, so that he may decide whether there is enough enthusiasm to warrant

making the circulating album a permanent institution. We have a supply of material on hand which will be sufficient to mount a goodly number of prints, so that the only expense to those who contribute to the album will be for the prints themselves, and for postage. We suggest also that individuals who wish to join, other than those who have already sent prints to the director, notify Mr. Jeffers, so that in case Secretaries are remiss, such individual members will find a place in the album.

The Exchange Club is now discontinued, and the Exchange list which follows will be published hereafter as readers may require.

EXCHANGE LIST

Any reader wishing to make print exchanges by mail with other readers may be listed in this department. On a *government postcard* — for our convenience in filing — give the following information: Name, address, size of prints for exchange, printing medium, subjects of prints offered for exchange. Readers are advised to state subjects fully, as a general classification will not bring as many requests for exchange as when subjects are itemized. We do not assume any responsibility for the proper exchange of prints; readers must make their own arrangements and settle any differences that arise amongst themselves.

S. J. Anderson, Box 32, Bellaire, Ohio. 3¼ x 5½ and 5 x 7 prints. D.O.P. Figure studies, bathing girls, Niagara Falls, lake views, Cuban views, San Francisco Fairs, and others.

Wm. Walter Beech, 2001 S. 58th St., Philadelphia, Pa. 2¼ x 3¼, 3¼ x 4½, and enlargements on various papers. Historic, scenic views, and figure studies.

Geo. E. Howell, 308 Lake St., West Hoboken, N.J. 2¼ x 3¼, 3¼ x 4½, and enlargements, black and white or sepia, on various papers. Landscapes and miscellaneous subjects.

W. R. Stevenson, 613 Railroad St., Jeannette, Pa. 3¼ x 5½. D.O.P. Miscellaneous.

Albert Limoges, St. Albans, Vt. Local scenes, lake views, child studies, general. D.O.P.

Mrs. Albert W. Wilsdon, 78 Charles St., New York, N.Y. 1⅝ x 2½. D.O.P. Street scenes, buildings, taken in New York, City.

Harry J. Armstrong, 2718 Green St., Salt Lake City, Utah. 2½ x 4¼, 5 x 7. D.O.P. Salt Lake views, and copies of New Zealand scenes.

Herman D. Warren, 624 Forrest Ave., Elgin, Ill. 4 x 5, 5 x 7. P.O.P. and D.O.P. Landscapes and general.

N. E. Nilsson, 219 W. Edwards St., Springfield, Ill. 3¼ x 5½, 5 x 7. D.O.P. Speed, animal, travel and historic.

Herbert Olson, Chappell, Neb. 3¼ x 5½. D.O.P. Country views.

Alfred Culp, 204 S. Atlantic Ave., Haddonfield, N.J. 3¼ x 4½. P.O.P. and D.O.P. Landscapes and portraits.

Ira T. Guldner, P.O. Box 483, Hutchinson, Kans. 3¼ x 5½, 5 x 7. Miscellaneous.

Ole Anderson, 310 1st St., N.E., Mason City, Iowa. 2¼ x 3¼, 3¼ x 4¼. Landscapes, and some pictures from Sweden.

F. L. Bennyhoff, Loogootee, Ill. 3¼ x 5½ to 5 x 7. D.O.P. Landscapes.

Robert Sliger, Oakland, Md. 2¼ x 3¼ to 5 x 7. Landscapes, marines, miscellaneous.

Geo. F. Doubleday, Suite 7, Alloway Court, Alloway St., Winnipeg, Man., Canada. 3¼ x 5½. D.O.P. Cathedrals, moonlight, flood, winter, park, beach, river, beach, local, and general views.

J.W. Jeffers, Frankfort, Ky. Vest pocket, 3¼x5½, 4 x 5, 5 x 7, and enlargements to 6½ x 8½, various papers, of scenery around Chattanooga. Lookout Mountains, New York, New Orleans and Frankfort, Ky., and also genre, a few figures and general.

NOTES AND NEWS

THE SANDMAN, HIS ANIMAL STORIES, by Harry W. Frees, with 32 illustrations from life photographs taken by the author. Boston. The Page Co., 1916. Price, $1.50.

The readers of AMERICAN PHOTOGRAPHY may possibly recall our publication sometime since of some interesting and well-posed animal pictures by Mr. Frees, who dressed up his cats and dogs and portrayed them in various appearing poses. Around a selection of these a very interesting child story has been written which the pictures illustrate in a manner certain enormously to interest the children. These pictures are distinctly original, and we recall no photographer of animals who has achieved anything in a similar vein and so well worked out.

* * *

THE SPELL OF SCOTLAND. By Keith Clark. Illustrated. Boston, The Page Company, 1916. Price $2.50 net.

Mr. Clark has a fine appreciation of the romance and tragedy of Scottish personages and places. He has a gift of choosing the right phrases to make the reader see the world of today under the glamour which history and literature have laid over many of its places. So he has truly put into his well-wrought book much of the spell of the Scottish land, and made it a delight to every imaginative reader. As to its pictures, they well show many of the people and places mentioned and visited, especially the historic castles.

* * *

THE SPELL OF THE HAWAIIAN ISLANDS AND THE PHILIPPINES. By Isabel Anderson. Illustrated. Boston. The Page Company, 1916. Price, $2.50 net.

This interesting record of travel in our Pacific possessions owes much of its value to the fact that its author was a member of an official party during most of the journeying described, and so had opportunities to see persons and places not ordinarily accessible to the traveler. Her descriptions are most interesting, and the historic value of much of her reminiscences is unquestionable. The book in text and illustrations is well worthy of inclusion in the notable series of travel books which it adorns.

THE CAMERA MAN, His Adventures in Many Fields. By Francis A. Collins, New York. The Century Co. 1916. Price, $1.30 net.

The adventures and achievements of camera men on the fields of battle in Europe, in Mexico, in aeroplanes, in the pursuit of pictures for newspapers, catching drama for the movies, serving the needs of commerce and science, etc., are told in interesting fashion in this volume. It is well and accurately illustrated.

* * *

THE AMERICAN ANNUAL OF PHOTOGRAPHY. Edited by Percy Y. Howe. New York. The American Annual of Photography, Inc., 1917. Price: paper, $1.00; cloth, $1.50.

Despite the depressing influence of the European conflict, our American photographic publications are doing splendidly, and the American Annual is living up to its reputation again this year. Articles and illustrations by our leading writers and pictorialists are abundant, and the volume is well representative of the best that is being done in this country.

* * *

READERS of the article on photographic surveying, reprinted by courtesy of *The Geographical Review*, will be interested to know that Mr. Howard Palmer, who was kind enough to lend us two of the illustrations, has made extensive use of the principles of photographic surveying in mapping the previously unexplored district occupied by the northern Selkirk mountains in British Columbia. The map published with his volume "Mountaineering and Exploration in the Selkirks" (Putnam's, 1914) is an exceedingly interesting example of the geographical results which can be obtained by a traveler whose activity may be largely devoted to another objective. In the appendix to Mr. Palmer's volume, the methods he employed with such success are fully set forth. With an ordinary roll film camera fitted with a good level, panoramas were secured from stations otherwise located. The prints were then bisected carefully by a line drawn with a needle on their surface, and these supplied the materials for the production of the map which has turned out to be surprisingly accurate for an exploratory survey. We recommend to any of our readers who may plan to experiment with this branch of photography a careful perusal of the appendix to Mr. Palmer's volume, which explains a simple application of the technical principles embodied in Mr. Bridgland's paper, although, of course, there is no pretension to the accuracy of result required in the official governmental work.

* * *

ANNUAL EXHIBITION OF THE UNION CAMERA CLUB

THE Annual Exhibition of the B.Y.M.C. Union Camera Club, 48 Boylston Street, Boston, opened Wednesday evening, December 6, to the public and continued through Thursday and Friday evenings, December 7 and 8, from 6 to 9:30 o'clock and Saturday, December 9, from 2 to 9 o'clock

The collection of photographs was well worth a visit, and the prizes in many cases were taken by some of the newer members.

The awards follow: *Landscape:* First Prize, Arthur Hammond; Second Prize, T. Willis Gary. *Portrait:* First Prize, Arthur Hammon; Second Prize, Louis Astrella; *Marine:* First Prize F. W. Hill, Second Prize, C. E. Dodge, *Genre:* First Prize, Chester Grillo; Second Prize, Louis Astrella. *General:* First Prize, G. H. Seelig; Second Prize, Charles G. Wells.

The judges were: Frederick W. Horsman, Frederick W. Allen, and Florence Maynard.

The B.Y.M.C. Union Camera Club was organized in 1908 and has a membership of seventy-five, mostly amateur photographers. The club quarters are well equipped with dark rooms for developing, opportunities for printing, enlarging, and indoor photography. A social room and locker accommodation for members are also provided.

* * *

THE C. P. Goerz American Optical Co. has just announced to their office and factory staff a general increase in salaries and wages to take effect about December 15, 1916.

The reason given is the ever increasing cost of living which the management feels should be compensated for as far as the rather adverse conditions under which the Goerz Company has to work on account of the war abroad, will allow by a suitable increase in the earnings of their loyal employees. The proposed increase will add more than 10 per cent to the present pay roll of the Company.

* * *

AN inaccuracy occurred in the specifications of the Ansco V.P. No. 0 in Ansco Company's advertisement of this model in the December number. This camera is furnished with Actus shutter and Modico Anastigmat lens, *f*: 7.5, at $15, and with Extraspeed Bionic shutter and Ansco Anastigmat lens, *f*: 6.3, at $25.

* * *

IN view of the discontinuance of our Exchange Club, we are pleased to note that the organization made an impression on some of our readers as a valuable feature for progressive workers. From Mr. Frederick Gallie, Secretary of the Little Rock Camera Club, we are in receipt of a request for names of Arkansas amateur photographers who would like to join with the club in circulating an album. We heartily indorse the circulating album project and trust that any readers interested will address Mr. Gallie, care of the club at Little Rock, Ark.

* * *

IN spite of the increased price of production, the Wellcome Photographic Exposure Record and Diary is once more offered to the public at the usual price of 50 cents. This little volume is well known to most of our readers, but for those who are newcomers, it should be said that the volume is bound in red cloth, the size of a small pocket diary. It contains many pages of photographic information regarding various processes, with blank pages for exposure record and diary. The usual disk exposure meter is supplied as a part of the volume, enabling the user to calculate exposure for any class of subject under all conditions.

* * *

FROM the Eastman Kodak Co., we are in receipt of the latest Kodak novelty — a bank! This is one of the dime cylinder banks, of the type which cannot be emptied until it is filled. An adjustable feature has been added so that the bank can be set to hold a definite number of dimes, dependent on the camera which the "depositor" plans to buy with the fruits of his savings. It is a rather ingenious little device, and has possibilities which will be readily recognized by those who would like to put their pin money to satisfactory photographic use.

Photo by L. E. Loebel

Bausch and Lomb

Through and Over—

—with most of his lens troubles, is the amateur who is equipped with a

Bausch and Lomb TESSAR LENS

Master of Speed and Light

The Tessar is a lens which meets and overcomes difficulties which prove too great for the ordinary camera lenses. Besides the great speed of the Tessar Ic (F:4.5), which is three times that of the average rectilinear, this lens has a very large field in proportion to its focal length; and its brilliant illumination, together with wonderful speed, make it a constant source of satisfaction.

The IIb Tessar (F:6.3) is a speed lens which can be fitted to any compact hand camera. It passes 61 per cent more light than does the average rectilinear.

Ask your dealer about trying a Tessar on your camera.
Write for our instructive booklet, "What Lens Shall I Buy"?

Bausch & Lomb Optical Co.

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NEW YORK WASHINGTON CHICAGO SAN FRANCISCO

Leading American Makers of Microscopes, Projection Lanterns (Balopticons) Photographic and Ophthalmic Lenses, Stereo Prism Binoculars and Other High Grade Optical Products

There is Novelty—

—new interest and entertainment, as well as better justice to your pictures, by showing them to your friends with the

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BALOPTICON
THE PERFECT STEREOPTICON

Whether you prefer to make lanternslides or to use actual prints, with the Balopticon your pictures come up on the screen with all details in crisp sharpness over the entire field — no blurred corners or weak edges.

The illuminating unit of the Balopticon is our recent adaptation of the gas-filled Mazda lamp, which gives more brilliant illumination than the usual A.C. arc, at less current expense. It is wholly noiseless and automatic, needing no rheostat.

Various models of the Balopticon are made, some for use with slides, some to project opaque objects (prints, postcards, pictures, etc.) in natural colors and some combined models for both forms, with instant interchange.

Model B (for slides) $25 up — Home Balopticon (for prints) $35 — Combined Model, $45 up.

Write for our interesting catalog of the Balopticon, giving full descriptions and prices of all models.

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Vest Pocket Autographic KODAK $8.25

Regular $10 Size

THIS *Autographic* Vest Pocket Kodak Special—with *F: 7.7 Anastigmat* Lens for $8.25. Here is, without doubt, the greatest camera offer ever made. You couldn't buy this outfit from any dealer for less than $10.

We Can Save You Money On Any Camera

We are equipped to sell or exchange cameras and lenses. Trade your old camera to us for a later model. The working parts of a camera do not wear out. The lens on a partly used machine is every bit as good as it is on a new one. Here is the big point—buy a good, used machine from a reliable firm. A firm who will *back you* and *the outfit* you get. Every day, from every state in the Union, we get cameras—from a Brownie to the latest model Graflex.

10 Days' Trial—Every camera you buy from us is *guaranteed* and subjected to a 10 days' trial. If it doesn't satisfy you completely, send it back and we will return your money. We aim to please entirely and will do everything within our power to do so

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"I received the 3-A Graflex, and it is in perfect condition. This is one time I received all or more than I expected or bargained for. The instrument is a beauty and is apparently just from the factory, so far as wear is concerned. Some time I expect to get a good plate camera, and will remember the David Stern Co.

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This is an example of the letters we receive almost daily from our customers.

Mail the Coupon Today! Or write us a letter. Talk freely, tell us what you want and what you have. We are in a position to save you money, and we will do it. Give us the chance. Professionals and amateurs the country over endorse and recommend our service.

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Warning—*Do not send goods on approval to strangers unless you are sure that a deposit equal to the value has been made with us or some other responsible person. Do not send money to strangers for goods without investigating their responsibility. Goods may be sent by express C.O.D. with privilege of examination, without risk of loss on either side. The publishers of AMERICAN PHOTOGRAPHY cannot accept responsibility for loss when such elementary precautions are not observed.*

SEND ORDER AND REMITTANCE TO AMERICAN PHOTOGRAPHY, 221 COLUMBUS AVE., BOSTON, MASS.

CAMERAS AND SUPPLIES

3A EASTMAN FOLDING POCKET KODAK, *f*: 6.3 Zeiss anastigmat lens, Optimo shutter 1-300, plate attachment, 6 double plateholders, carrying case, metal tripod. Cost, $80.00; sell, $25.00. 5 x 7 Seneca camera, *f*: 8 lens, Duo shutter, 3 plateholders with two inside kits, 3¼ x 5½; all in good condition. C.O.D. HELGE HAGSTROM, 510 Hains St., Kane, Pa.

$50.00 BUYS GOERZ V.P. TENAX, Dagor lens, with accessories. Outfit lists at over $80.00. Equal to new. H. W. PRIPPS, 1360 9th St., Milwaukee, Wis.

WANTED—3A Graflex, *f*: 4.5, and 3A Special Kodak, *f*: 6.3. F. M. BROWN, 1937 Fremont Ave. South, Minneapolis, Minn.

FOR SALE OR TRADE—Photographic portrait lens No. 3 "Deardorff" Chicago, pat. 1889. Fine condition, cost $150.00. Cheap for cash, or want folding kodaks, books, guns, watches, diamond, or something of value. SYD EVANS, Klamath Falls, Ore.

COMPLETE amateur finishing outfit for sale, cheap, including 3A and 5 x 7 cameras. Write for list. Will refuse no reasonable offer. ALBERT LIMOGES, 12 Hunt St., St. Albans, Vt.

WILL EXCHANGE my Conley folding camera, 3¼ x 4¼, anastigmat lens, compound shutter, for a 3¼ x 5½ folding camera with rapid rectilinear lens. Mine is a roll film; will accept film pack, plate, or roll film. PETER HAY, Coal Creek, Colo. *

FOR SALE—6½ x 8½ Conley view camera and outfit. Also combination printing and enlarging illuminator with attachments. Bargains. Reducing equipment. L. O. SURLES, Box 434, Cuthbert, Ga. *

FOR SALE—2A Brownie, A1 condition, $5.00. Mandolin and case, make offer. J. R. FRYE, Belleville, Mich. *

WANTED—Reflex camera, quarter plate, without lens, long bellows. Also back numbers of photographic magazines. State prices. ROBERT E. McCLYMONT, 212 Robert St., Toronto, Can. *

FOR SALE—3A Kodak, $10.00; 3¼ x 4¼ double-extension camera, Goerz Syntor *f*: 6.8 lens, compound shutter — $67.50 outfit for $35.00. Correspondence course in mechanical drawing, with instruments, $6.00. O. LYNUM, 157 11th Ave., Seattle, Wash. *

NO. 2 AND MODEL XI CONLEYS with accessories; No. 1 Premo tank; print trimmers; Metol. Must sell; perfect condition. Send offers. Box 55, Mather, Wis. *

FOR SALE—New 3¼ x 4¼ Speed Graflex, Zeiss kodak lens *f*: 6.3; with film pack adapter, three plateholders, and developing tank. Perfect condition. Cost, $57.00. Sell, $45.00 cash. G. L. MARTIN, Auxvasse, Mo. *

FOR SALE—1915 Press Graflex, plate magazine six holders, perfect condition, $80.00. Goerz Celor lens, No. 5, new, $70.00. FRED HAMMER, care of *Gazette*, Lima, Ohio. *

COLORING

FINISH YOUR PRINTS AND ENLARGEMENTS in beautiful lifelike colors by our remarkable process. Easy, fascinating, profitable. Inexpensive outfit. Get information. PHOTO-KROME CO., Box 113, Scranton, Pa.

MISCELLANEOUS

UNUSUAL OPPORTUNITY. For Sale — Two pictures on glass, each 4½ x 6 inches. Subjects, Holy Night and Reading Magdalen. These are the oldest photographs in existence, as photos of paintings on glass were the first attempts in photography. This is a rare opportunity for collectors. Price, $7,000.00 each. Address PICTURES, care of American Photography.

WILL TRADE rubber stamps or seals for anything I can use, photographic or otherwise. H. D. WILSON, P.O. Box 8, Phoenix, Ariz. *

FOR RENT — Photographer's studio, unfurnished, first class; live oil city. MILLER, 1201 Keeler Ave., Bartlesville, Okla.

WANTED — To buy a typewriter and to sell American Photography for 1916, and other magazines. W. H. WILSON, Troy, Ind. *

WINTER and Summer, day and night, photographers who use Columbia White Flame Carbons make efficient use of their equipment and increase the income of their investment. NATIONAL CARBON COMPANY, Cleveland, Ohio.

1,000 GUMMED LABELS, size 1 x 2 inches, printed to order, only 50 cents, postpaid. Samples free. GN. EDWARD HARRISON, Baltimore, Md.

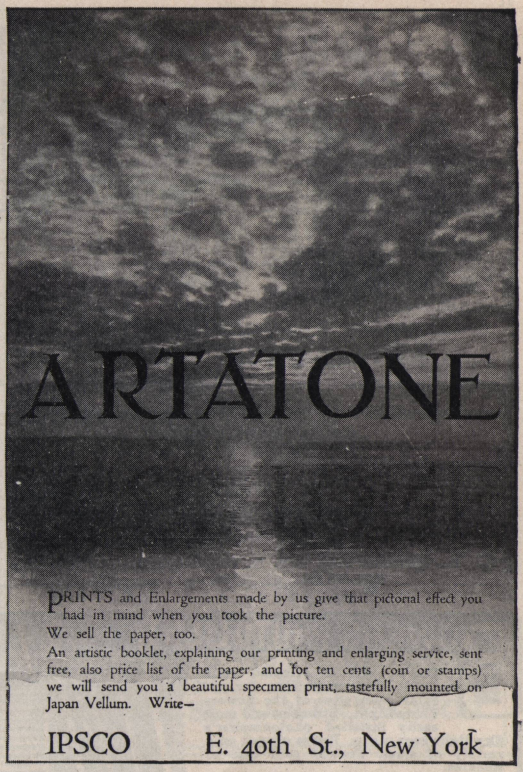
NEW IDEAS. NEW METHODS. Better photographs—more money. Daddy Lively's way taught by a rapid method. Complete course for beginners, opening January 8, 1917. Special post-graduate course for professionals in February. Write for catalogue and information. SOUTHERN SCHOOL OF PHOTOGRAPHY, McMinnville, Tenn.

WARNING — We hereby warn dealers and private parties against buying, or taking in exchange, one 5 x 8 Bausch & Lomb IC Tessar F: 4.5, serial No. 2377107. This is a brand new lens in a black mount, and was stolen off our showcase. A liberal reward will be paid for information leading to the arrest of the thief. CARMICHAEL'S CAMERA AND LENS EXCHANGE, 111 Summer St., Boston, Mass.

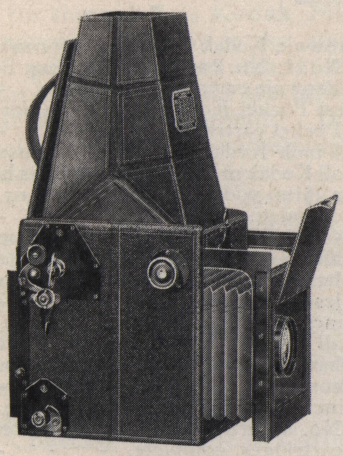
ENLARGING

ENLARGEMENTS. 8 x 10, 25 cents; 11 x 14, 40 cents. Postpaid, work guaranteed. ENLARGEMENTS SHOP, 33 Main St., Cincinnati, Ohio.

You can make $3.00 to $10.00 daily taking orders for enlargements. Our representatives become independent. Particulars MALWITZ STUDIO, Brillion, Wis.



The Revolving Back Junior



The Revolving Back Junior makes 2¼ x 3¼ pictures on roll film, plates or film packs. It is fitted with the Graflex Focal Plane Shutter operating at any speed from "time" to 1-1000 of a second. When you look in the focusing hood, you see the image right side up, the size it will appear in the finished picture, and this image remains brilliantly visible up to the instant of exposure.

The back of the camera revolves, enabling the user to make either vertical or horizontal negatives without turning the camera on its side.

SEND FOR CATALOG

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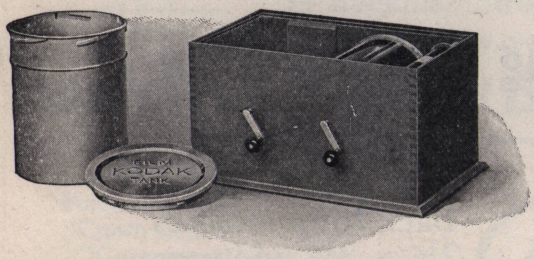
Eastman Kodak Co.
ROCHESTER, N. Y.

Eastman Kodak Company

ROCHESTER, N. Y., *The Kodak City.*



IT DOES THE REST.

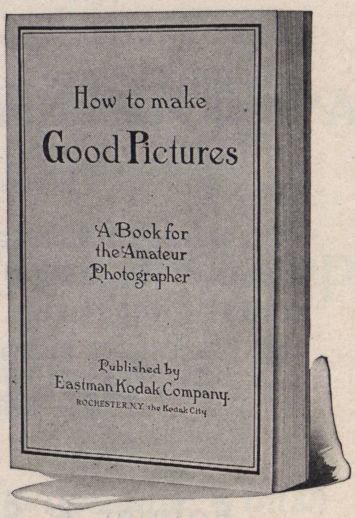
We used to advertise: "We do the rest". Later, when Kodak's simplification of photography was fully under way, we suggested that you were perfectly capable of doing the rest yourself. And now, that developing, at least, has become practically automatic, three phrases indicate the stages through which film developing has passed: "We do the rest", "You can do the rest", and "It does the rest". And "it" of course refers to the Kodak Film Tank.

The dark room properly belonged to the dark ages and so the Kodak Film Tank pushed it into the past tense. For a time there was a little competition between the two. There were amateurs who were still loyal to the dark room for no reason in the world except that some people are fond of relics but the obvious convenience of developing by daylight as well as the better quality of the resulting negatives were facts not to be denied. As a result the number of dark room developing devotees has steadily decreased.

The Kodak Film Tank consists of a winding box, a light proof apron and a solution cup with cover. The entire outfit is self-contained in the winding box so that it occupies the minimum of space when not in use. The operation of the outfit is very simple. The film to be developed is put in the winding box where it is wound in conjunction with the light-proof apron in such fashion that it is effectively screened from the light. It may then be taken from the box and exposed to broad daylight without danger of fogging. Covered with the apron it is lowered in the solution cup, the cover is clapped on and the developer is allowed to work for twenty minutes at the conclusion of which time the negatives are ready for fixing.

Prices.

Brownie Kodak Film Tank, for use with No. 1, No. 2 and No. 2 Folding Pocket Brownie cartridges, complete, - -	$2.75
Vest Pocket Kodak Film Tank, for Vest Pocket cartridges, complete, - -	2.75
2½-inch Kodak Film Tank, for use with all Kodak or Brownie cartridges having a film width of 2½ inches or less, complete, - - - - - - -	4.00
3½-inch Kodak Film Tank, for use with all Kodak and Brownie cartridges having a film width of 3½ inches or less, complete, - - - - - -	5.50
5-inch Kodak Film Tank, for use with all Kodak and Brownie cartridges having a film width of 5 inches or less, complete, - - - - - - -	6.50
7-inch Kodak Film Tank, for use with No. 5 Cartridge Kodak or shorter film cartridges, complete, - - - - -	8.00



THE PRICE

"How to Make Good Pictures," paper covers, - $ .25
Library edition, cloth bound, - - - - - 1.00

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

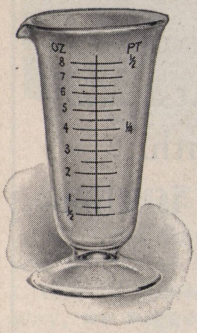
At your dealer's.

Eastman Kodak Company

ROCHESTER, N. Y., *The Kodak City.*

LITTLE THINGS PHOTOGRAPHIC THAT COUNT

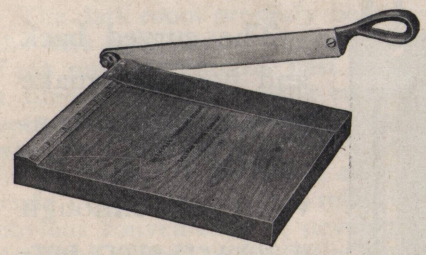
EASTMAN VISIBLE GRADUATE



As a rule graduates are hard to read—the Eastman Visible is the exception that proves it. The opaque graduations fairly jump out from the glass so that the accurate measurement of even a colorless liquid becomes a very simple matter. Even in the dim light of the dark room the markings are easily read.

The price of the Eastman Visible Graduate ranges from $ .20 to $ .60, according to size.

KODAK TRIMMING BOARD



Here is an efficient little trimmer made of hard wood and fitted with a good quality steel blade. The transparent Trimming Gauge supplied at an extra cost of twenty cents will be found a profitable investment.

The Price

No. 1 capacity 5 x 5″	- - -	$0.50
No. 2 " 7 x 7″	- - -	0.70

KODAK JUNIOR FILM CLIP

One jaw *might* prevent the film from slipping, but the Kodak Junior Film Clip isn't taking any chances and is consequently fitted with two jaws. It's a practical convenience for the drying of films.

The price, ten cents.

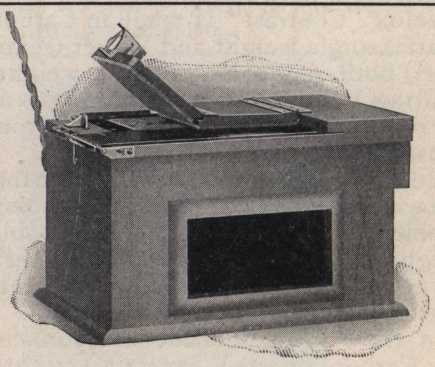
KODAK DRY MOUNTING TISSUE

It is in winter, during the shut-in days, that an album receives special attention and that the loose prints accumulated through the summer months are properly mounted. And this is the reason why winter is the open season for Kodak Dry Mounting Tissue. It's the ideal mount medium—the print and mount are in perfect contact and there can be no curling on even the thin album leaf.

KODAK PORTRAIT ATTACHMENT

It's an extra lens which when slipped on over the regular lens equipment brings the camera in focus at close range. The image is consequently large—head and shoulder portraits, for example, may be made to occupy most of the picture area.

The price, fifty cents.



THE KODAK AMATEUR PRINTER

A printing frame, a printing light, a dark room light and an automatic masking device all rolled into one compact little box—that's the Kodak Amateur Printer.

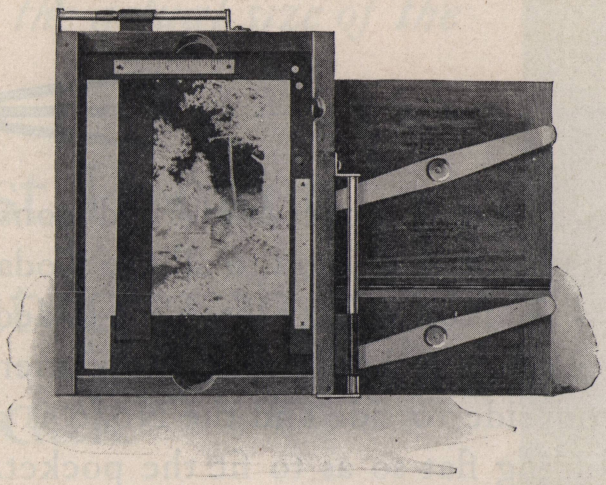
THE PRICE.

Kodak Amateur Printer, - $6.00

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

At your dealer's.

The newest of the Kodak helps



KODAK AUTO-MASK PRINTING FRAME

A mask that may be adjusted as the amateur wills within the limits of the regular amateur sizes.

Especially convenient for duplicate prints as the negative is held firmly in proper position for one print or a hundred without the necessity of re-masking.

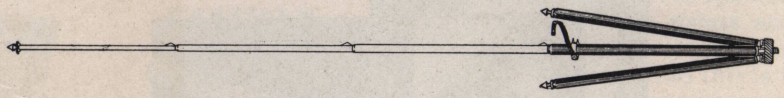
THE PRICE.

Kodak Auto-Mask Printing Frame, . . $1.00

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

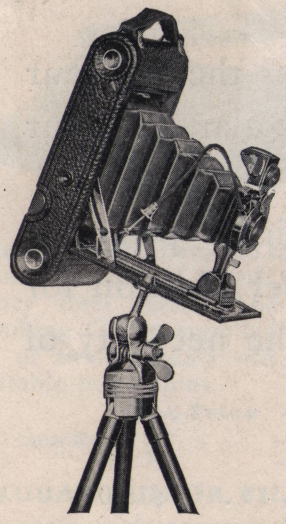
At your dealer's.

Kodak Metal Tripods



Light weight, compact and rigid construction are characteristics common to all the Kodak Metal Tripods while Nos. 1 and 2 have the added feature of a revolving head allowing the camera to be swung from side to side and the No. 6 is a pocket tripod, folding flat so as to fit the pocket.

The Price ranges from $2.25 to $6.00 according to size and style.



Universal Tripod Head

Fits any amateur tripod and allows the camera to be tilted at any desired angle—even straight upward or directly down.

THE PRICE.

Universal Tripod Head, . . . $ .75

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

At your dealer's.

This is the actual size of the

Vest Pocket Autographic Kodak

Small enough, as you see, to slip in pocket, hand bag or muff and yet big enough, as the resulting pictures will prove, to tell the story in a clean-cut, convincing fashion.

Mechanically as right as a watch —photographically as capable as any camera.

THE PRICE.

Vest Pocket Autographic Kodak, meniscus achromatic lens and Kodak Ball Bearing shutter,	$6.00
Vest Pocket Autographic Kodak *Special*, Kodak Anastigmat lens, *f*.7.7 and Kodak Ball Bearing shutter,	10.00
Ditto, with Kodak Anastigmat, *f* 6.9 lens,	20.00
Ditto, with Bausch & Lomb Kodak Anastigmat, *f* 6.9 lens, (formerly listed as the Zeiss Kodak Anastigmat)	22.50

EASTMAN KODAK COMPANY,

ROCHESTER, N. Y., *The Kodak City.*

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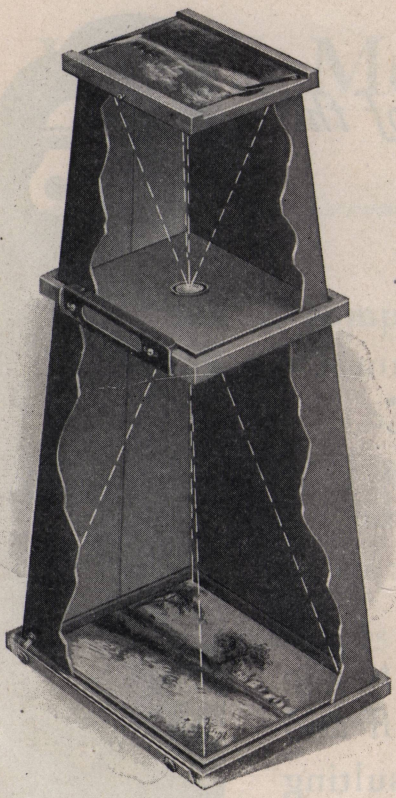

Brownie Enlarging Camera

It's as easy to make enlargements with this instrument as it is to make pictures with a Kodak.

THE PRICE.

V. P. Kodak Enlarging Camera, for 3¼ x 5½ enlargements from 1⅝ x 2½ negatives,	$1.75
No. 2 Brownie Post Card Enlarging Camera, for 3¼ x 5½ enlargements from 2¼ x 3¼ negatives,	1.75
No. 2 Brownie Enlarging Camera, for 5 x 7 enlargements from 2¼ x 3¼ negatives,	2.00
No. 3 ditto, for 6½ x 8½ enlargements from 3¼ x 4¼ negatives,	3.00
No. 4 ditto, for 8 x 10 enlargements from 4 x 5 negatives (will also take 3¼ x 5½ negatives),	4.00

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

At your dealer's.

What the Kodak Film Tank does for films, the

EASTMAN PLATE TANK

does for plates, producing fog-free negatives of highest obtainable quality with the maximum of convenience.

For the amateur using plates the Eastman Plate Tank is a real necessity.

THE PRICE.

Eastman Plate Tank, for 4 x 5, 3¼ x 5½, and smaller plates, includes solution cup, plate cage, loading fixture and adjustable kit, - - - - -	$4.00
Ditto, 5 x 7, without kit, - - - - -	5.00
Separate Kits, for 5 x 7 tank, to take 3¼ x 5½, 4¼ x 6½ or 4¾ x 6½ plates, each, - - - - -	.75

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

At your dealer's.